ELECTRICAL WORLD

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September 29, 1934

The FUNDAMENTAL TOOLS

FOR BUILDING HOME, COMMERCIAL AND INDUSTRIAL LIGHTING LOAD

Model 614
WESTON direct-reading
Foot-Candle Meter

Model 703
WESTON direct-reading
Junior Foot-Candle Meter

The Sight Meter
A model made for the
Sight Light Corporation

BETTER LIGHT **WESTON** **BETTER SIGHT**

Instruments

Weston Electrical Instrument Corporation, 578 Frelinghuysen Avenue, Newark, New Jersey

ELECTRICAL WORLD

FOUNDED IN 1874 • READ BY ELECTRICAL MEN FOR SIXTY YEARS

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Reader's Guide to This Issue

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THIS INDEX is merely a convenient guide. Many articles will appeal to several reader groups—many will apply to all. News and other deparments are of general interest.

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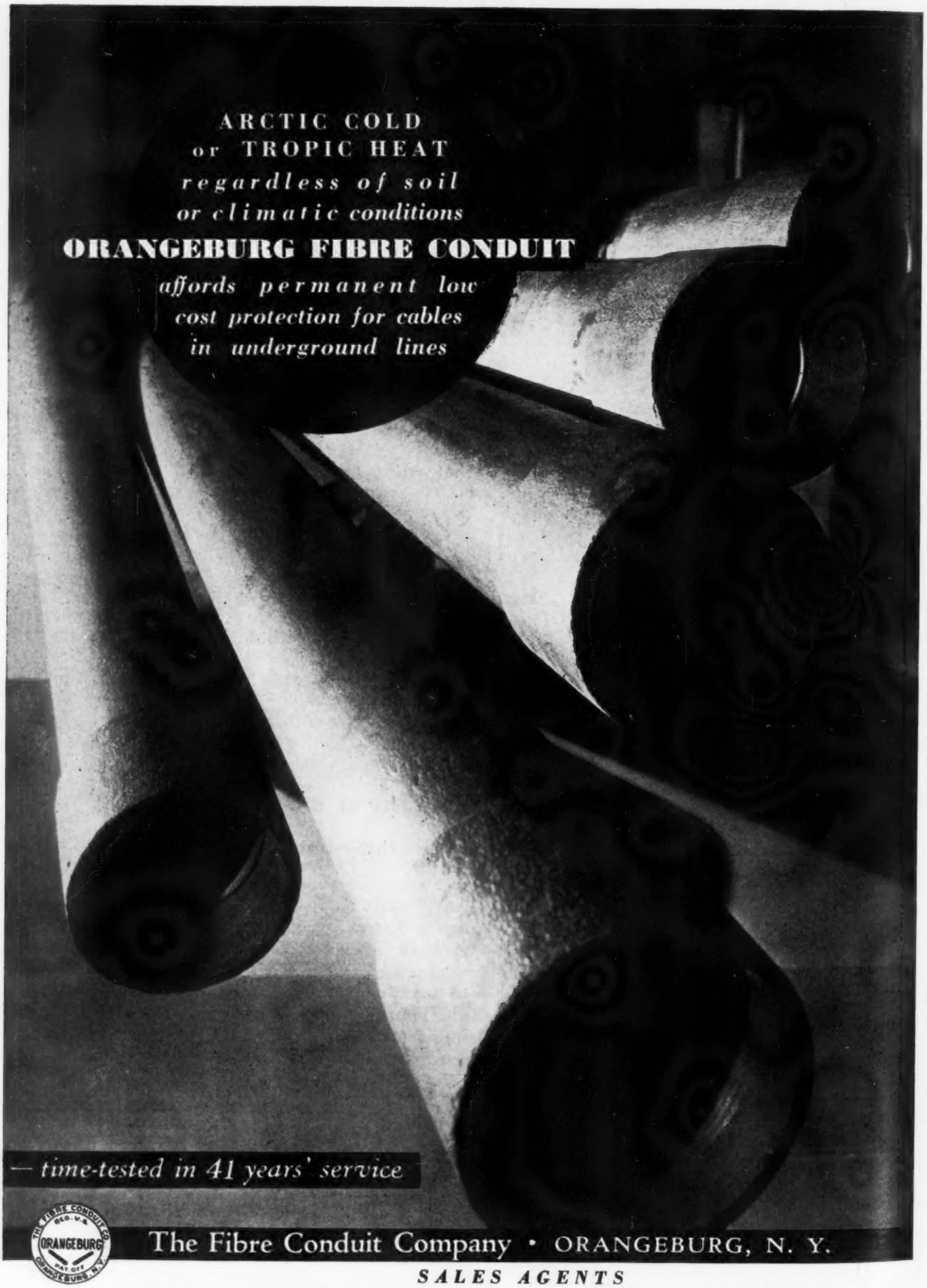
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ELECTRICAL WORLD

MANAGEMENT · ENGINEERING · OPERATION · UTILIZATION

PUBLISHED EVERY OTHER SATURDAY

SEPTEMBER 29, 1934

Light Comes to Life

ELECTRICAL men are about to make what may well be their most important social contribution. An idea is just dawning. Its significance is still not generally recognized.

For fifty years the light and power companies have been talking about light. The industry sprung from Edison's lamp. It was organized around a lighting service. Lighting load is still the basis of the business. But from the standpoint of human welfare, the most vital discovery about light is only just now being made. Its relation to eyesight and its influence upon health and man's ability to think and work.

In the last half century the eyes of man have paid a heavy price for progress. Science has upset the simple balance of natural living, established through a million years of human evolution. Increased reading of newspapers, magazines and books, rapid transportation, motion pictures, intense light sources, night life—innumerable abnormal influences piled one upon another—have built up a burden of strain upon the human eye that has put nearly half the people in the country upon crutches—crutches for seeing. In grade school 20 per cent, in college 40 per cent, in middle life 60 per cent, among the elderly 95 per cent of this generation have defective vision. We have been destroying the eyes of the American people through ignorance, indifference and neglect.

THIS is not an indictment of the electrical industry. Illuminating engineers, lamp men, lighting companies have realized the menace of the situation. They have long preached prevention. But the public would not listen to such abstract warnings. And the way had not been found to make a human story of it and to arouse popular anxiety and interest. That only came with the conception of the new appealing "science of seeing" and a protracted research into the humanitarian and economic aspects of defective vision.

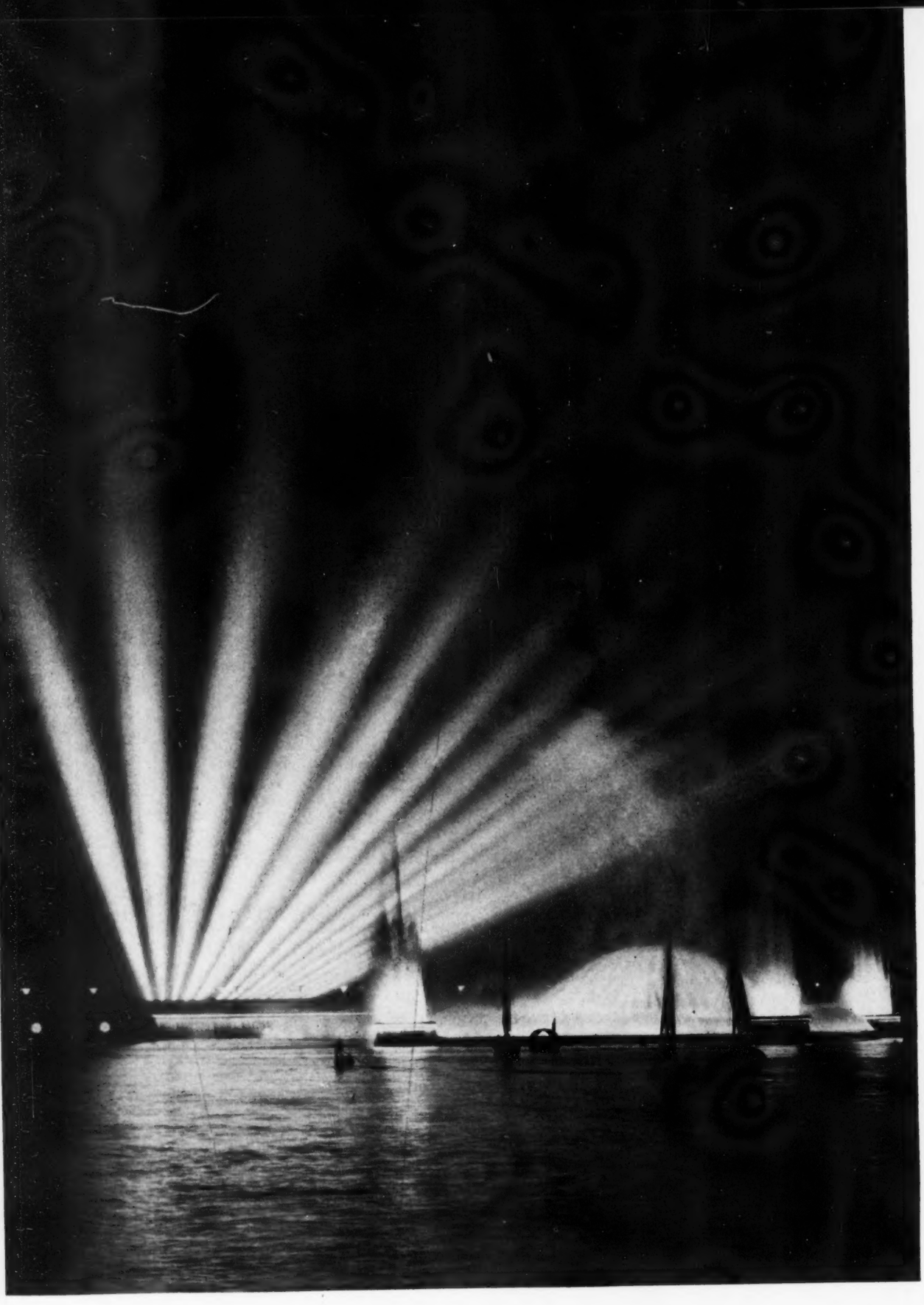
How this knowledge has been applied to the development of a new technique in selling light is told in other pages of this issue. The purpose here is to point out the profound importance of this movement by electrical men, as a contribution to the public welfare and, by virtue of that fact, the scope of the commercial opportunity that is unfolding.

Light has a universal application. In factories speed and precision are at a premium. In stores merchandising has focussed on display. In offices efficiency and welfare have been highly organized. On our streets and highways safety has become a national problem. In each case light is vital to solution. The field for development is as broad as the nation.

SO THE new development is well timed. With rates going down and taxes up, the power industry needs more load from present customers. Light is the common denominator of electric service, and if the market opens for a greater use, it makes every connected factory, store and home once more a prospect. And at the same time the vast field of street and highway lighting is reawakening.

The overwhelming majority of the 24,000,000 connected customers of the power industry are now using light both inadequately and ineffectively for their own good. It is no wonder, then, that the industry has been stirred with something like a thrill, when the key to this great sleeping market has apparently been found. The more enterprising utility companies have been quick to respond and the early experimental selling with the new approach has brought spectacular success. Manufacturers of lamps and equipment are developing new products and programs to tie into the new methods of demonstration and service.

Over and above it all, however, shines the compelling purpose to rescue our children and our children's children from the loss of the priceless heritage of good eyesight. For this reason, all men will rejoice that light has come to a new life and found its voice for broader service.



MODERN FAIRYLAND WITH ELECTRIC LIGHT

Daring effects with paint and light made the Century of Progress a success. It sold the idea of light as a basic consideration in architecture and decoration. Looking across the lagoon to the great electric fountain and the artificial Aurora Borealis

New Tools for Selling Light

Out of the "Science of Seeing" Comes a New Art of Selling That Is Opening a New Market Through Showmanship Based on Demonstration Equipment

For years lighting has been the great back-log of the electrical business. But for a long while it has lacked those new and novel elements that hold public interest and bring expansion. Utilities have tried to build more lighting load and seen it fall off under the depression. Now comes new thought, and lighting surges ahead, revitalized by new selling technique.

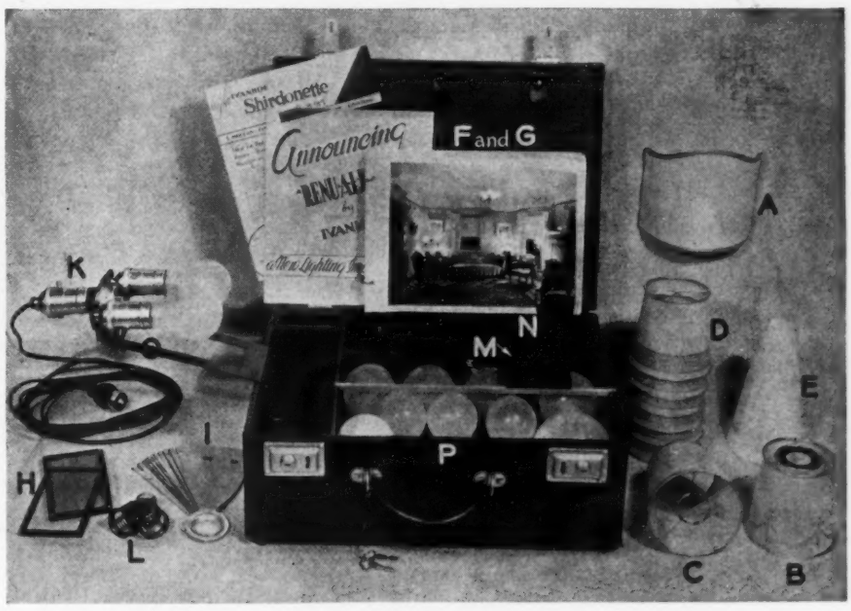
LIGHTING is staging a New Deal all its own. Suddenly, after years of doldrums, we find intense interest and activity throughout the electrical industry in selling domestic, commercial and industrial lighting, and even a new attitude toward street and highway lighting. Many people are wondering what it is all about.

The answer is that the lamp companies and the equipment manufacturers have awakened all at once to the fact that nobody is interested in abstract light and it should not be expected. They have discovered that the only thing people are concerned with is seeing, which is something very different. Dr. Luckiesh of Nela Park recognized this several years ago. Out of this idea he has developed what he has called "The Science of Seeing," from which a whole new approach to the application of lighting has been constructed.

But the important part is that this entire renaissance in lighting thought and technique has sprung from a series of demonstration equipments by which the customer sells himself. These new selling devices have grown out of the newly developed science of seeing and the invention of the photronic cell and its ingenious application in the sight meter.

This is the second big spurt in lighting progress. Twenty-five to thirty years ago the intense brilliance of the tungsten lamp made shades really necessary for the first time. Out of it grew a scientific study of light refraction and reflection. Illumination was then dramatized to the American people by a campaign of showmanship that drew crowds into halls and theaters all over the country. It was an engineers' show. They set up the ballyhoo and people flocked out to see a new marvel of science. And these illuminating engineers talked foot-candles and photometric curves and kilowatt-hours and showed that light could be turned "from a raw material into a finished product." As a result a great market was built up for reflectors. People bought, however, not because they were interested in light, but because the tungsten lamp hurt their eyes and they had to do something about it.

Lamp men, fixture men, power company men, contractors and dealers have continued talking about light. But John and Mary in their home and men in office, store and factory have continued to buy lamps and shades for appearance and to use the minimum light that they think they can get along with. Normal people are just not interested in light. The housekeeper is interested in decoration and comfort. The storekeeper is interested in merchandise and customers. The manufacturer is interested in machinery and methods. Even when the foot-candle meter came out it was still an engineer's plaything. Nobody was much intrigued by the little grease spots that only told them how intense the light was. And so the lighting industry has gone along living in its own world, talking its own language

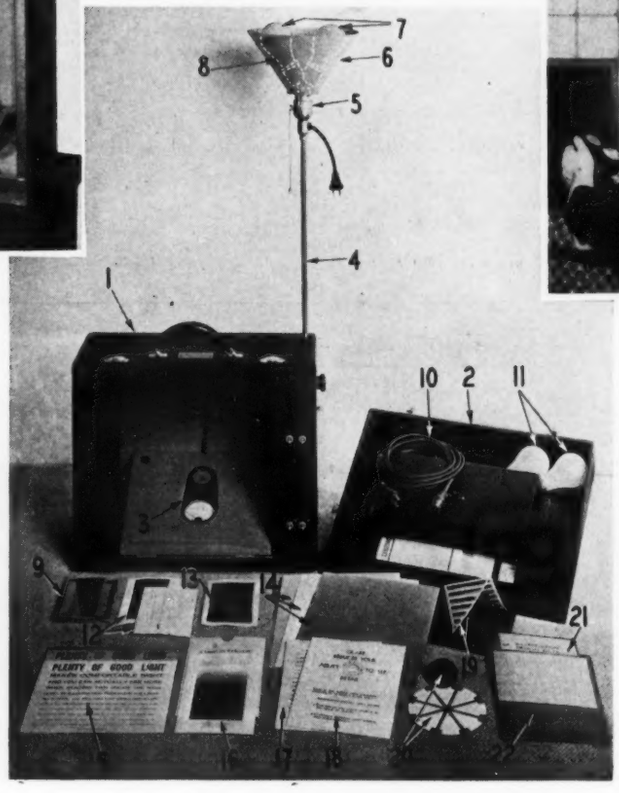


This demonstrator kit builds up the new appeal in the home

It contains shades (A to E), photographs (F), color boards (G), dust and dirt glasses (H), a collapsible reflector for indirect lighting (I), cords, rack, lamps (J, K, L, O, P) and a sight meter (M, N), all in a handy carrying case.

The sight meter starts the process when the customer begins to measure her light

The "sight-light demonstrator" used in the salesroom and store. With it the customer finds out for herself how much light she needs to read the telephone directory or for sewing



Commercial and industrial lighting salesmen use this more elaborate demonstration equipment

The case (1) is fitted with four lamps, a diffusing shade and motor-driven turntable. It carries a Weston foot-candle meter (3), dust and dirt slides (9), cloth samples for stitching (12), paint samples (14), reading charts (15), a visibility indicator (16), glare charts (17, 18), a shadow grating (19), motion disks (20), together with lamps, reflectors and other items.

points where she habitually does them. He also shows her the effect of the color and shape of shades.

Three—A commercial lighting kit, comprising lamps, reflectors, dust and dirt slides, cloth samples, paint samples, reading charts, visibility indicators, glare charts, shadow and speed of vision indicators, a foot-candle meter, a wall meter and other gear, with which light can be measured on the merchandise or the work and in the locations with which the customer is concerned. He discovers the light that seems to be best for his work, measures its intensity and compares his present light. He sells himself.

and wondering why people were so indifferent to something so important.

The tide turned when Weston developed a photo-electric instrument to measure light intensity. Then Canfield adopted and popularized it as a tool for salesmen and called it a "sight meter." Here is something that the customer can use to see how much light he is getting anywhere in his home or store. But it still lacked the vital point of human interest. The sight meter alone does not show him how much light he *needs*—the thing that has been holding back the sale of lighting from the beginning. And now that trick has been turned by the development of a series of demonstration outfits that make it simple and easy for the sight meter to tell the full story in terms of every prospect's individual interest. It arouses his curiosity and he finds the answer for himself.

There are three types of these special demonstration equipments now available and coming rapidly into use:

One—A demonstrator that provides a cabinet with a shaded lamp at the top with which the intensity can be raised and lowered at will, focussed on a rack at the bottom holding a concealed sight meter. The demonstrator is used on the power company sales floor, or in a store that sells lighting merchandise. You lay a newspaper, telephone directory, a fabric or some sewing on the rack and the customer adjusts the intensity of light so that he sees most comfortably. The sight meter is then uncovered and indicates the amount of light he has found as right for his eyes. He sees to his surprise the high intensity he has selected.

Two—A home-lighting demonstration kit, consisting of an assortment of lamps and shades, a collapsible reflector for showing indirect lighting, photographs illustrating lighting effects, sheets of glass for reproducing the effect of dirty lamps and reflectors and a sight meter. With this outfit the salesman enters the customer's home and by suggestion interests her in measuring the light now available and discovering for herself the intensity she finds comfortable for reading, sewing and other tasks at the

In other words, the lighting industry has stopped talking to people about light and begun to show them how to find out for themselves what illumination they need and why and how and how much. The manufacturers and the utilities together are developing a technique in approaching the customer and applying the demonstration equipment that is a surprising advance. Also the lamp companies have prepared an array of advertising and sales material for local use and national support that promises a popular appeal and a pressure of selling that has not been seen before in lighting development. On the strength of last year's Better Light—Better Sight campaign organization plans have been worked out for local power company operations that should bring great stimulus to lighting load development this fall and winter.

How Customers Sell Themselves

The Local Application of the New Approach in Lighting—How the New Technique of Demonstration Is Working Out in Home, Store, Office, Factory

THE organizing and staging of the new approach in lighting to capitalize the "science of seeing" has made interesting progress. Out of the Better Light—Better Sight activity last season and field work by the lamp companies and utilities a distinct new technique has been developed. Home-lighting prospects, of course, require one treatment and commercial and industrial customers another. Therefore, separate methods have been worked out for each field.

To develop the home-lighting market calls for a staff of young women, girls of personality and poise, who can meet all types of women and be at ease in any home. They are given a course of schooling in lighting and company policies and trained in the showmanship of demonstrating, using the home-lighting kit.

Demonstrations are normally staged in the living room, where lighting is most used, and there are the greatest opportunities for improving lighting conditions. The women carry lamps with them to fill empty sockets or exchange for the wrong size, but in each case the sale is billed through the dealer selected by the customer.

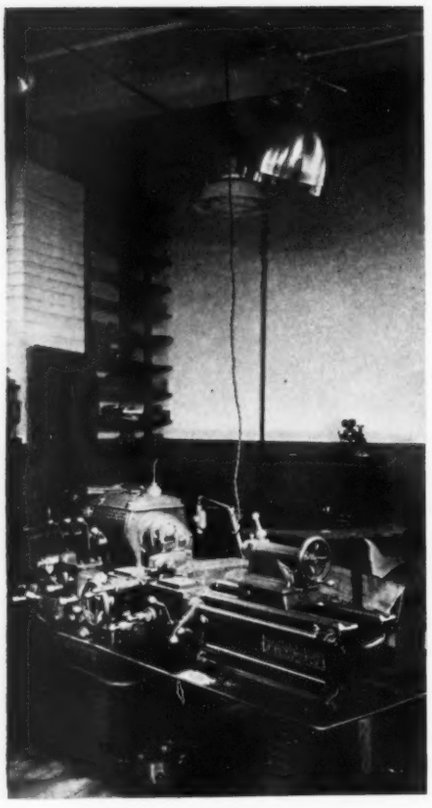
Many a brave selling idea has come a cropper when the customer refused to get excited. The genius of this plan lies in the fact that it is the prospect himself who discovers the need and finds the answer. This key is now unlocking the door to lighting apparently wherever it is tried.

On entering a home the caller spots the easy chair where the man of the house does his reading, sits in it and comments on how comfortable it is. She measures the amount of light "friend husband" is getting, and that leads into the story of the science of seeing. The prospect becomes fascinated in measuring herself the light her child studies by, the light by grandma's bed. She plays with the sight meter and gradually works into the matter of shades, lamp wattage and the cost of light, through a new interest in young and old eyes and their importance to the welfare of her family.

The girls talk to the women in all homes, if possible, leaving a sight meter, so that the prospect may resell the science of seeing story to her family that evening. This insures a call-back and makes a time to turn the recommendations into a sale. Call-backs are also secured by bringing in sample paper shades to try on some lamp. The I.E.S. student lamp, of course, is featured wherever there are children of the right ages. Forms for surveys, recommendations, reports and records have been worked out so that the entire operation is balanced, effective and under control.

One of the best examples of a well-organized campaign, following the new approach, comes from the San Joaquin Light & Power Corporation in Fresno, Calif. Here, since March, over a period of five months, a super-

The Cincinnati *Enquirer* has discovered that adequate illumination speeds the work and reduces errors and pied forms



This 150-watt spotlight produces 125 foot-candles focussed on the tool post of this machine

visor and five home-lighting women made 1,133 calls and 114 call-backs. They recommended 678,855 additional watts, or an average of 599 per home. On this call-back 88 per cent of these homes were making changes averaging 381 watts per home, or a total increased load of 403 kw.

E. G. Stahl, sales manager, considers the selection and training of these home-lighting women and the education of the dealers to handle the right type of equipment the vital factors in this work. In addition to all this, the effect upon public relations has been impressive. Women received the home service girl as a friend and talked it all over.

Because of the extent to which the use of light has been curtailed to save expense during the depression, commercial and industrial prospects offer particularly favorable opportunity for applying the new approach. In 1932 the American Gas & Electric Company asked Nela Park to help work out a plan to prevent the decrease in lighting load. A demonstration kit was developed to help show the customer how to get more out of his lighting dollar and to compare the cost of light with other expenses and show its sales value. American Gas & Electric was so pleased with the results of the first year's work that it increased the demonstrating staff from eight to 54. The Ohio Power Company, one of its properties, now has 50 men using this new approach in lighting sales. In all, about 75 utilities are using the plan, with around 2,500 men employed on it.

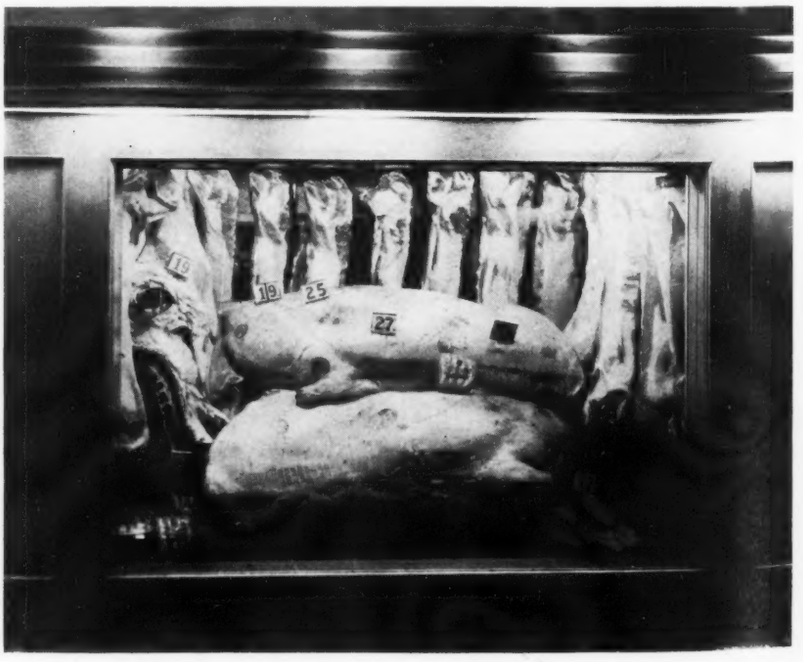
A more elaborate demonstration equipment has now been worked out by the lamp manufacturers with which the merchant or factory superintendent is led to discover for himself how much light his employees and his customers should have to display and to judge his merchandise. And the factory man finds out what light his employees need at the machines and benches in his plant, on the materials with which they work.

The approach to the customer is again from the service angle—the economic advantage of cleaning schedules, proper voltage lamps and efficient reflectors. The salesman avoids all technicalities and talks the language of his customer as far as possible. He talks of costs in units of butter to the grocer and chops to the butcher, and to the manufacturer in some unit of his own product. He does not go out as a salesman of lamps or reflectors, but as the representative of the utility. He leads up to a direct suggestion that he make a check to see if the customer is getting full value out of the light that he is buying.

With the demonstration kit the merchant then proceeds to look at samples of his merchandise under different intensities of illumination and see at what point color, texture and other details can be seen most comfortably and effectively—what kind of light is best to display goods in store and window. Then he discovers how much more light this is than the present lighting in his store. The manufacturer looks at pieces of the work in process under the demonstration light and sees the effect of glare and shadows and how much more intensity is needed on moving parts, if his employees are to notice flaws in the work. The effects of proper lamps and reflectors, proper cleaning and proper voltage are brought out. The reasons why he is actually buying light are analyzed. It is all reduced to terms of blemishes on dark leather goods, pit marks on gray castings, crack marks, broken threads in texture weaving, missed stitches, bubbles in glassware, spoilage of materials, loss of time and the other details that workers must watch for and inspectors must detect, according to the product.

The whole technique is worked out with fine showmanship. In this compact suitcase outfit is a whole ingenious bag of tricks that permit a variety of spectacular demonstrations that astonish the prospect by showing him what light really means to him.

[*Continued on page 85*]



Light in this butcher shop is made an active selling agent by using this wall space for a refrigerated inside show window. No eye escapes it

New Approach Gets Results

Accomplishments of Four Utilities—Significance of Results—Essential Elements in Organization

AT LEAST 22 utilities are now actively engaged in using the new demonstrational approach* for convincing customers of the value of improving illumination. By Thanksgiving virtually every salesman contacting homes, stores, commercial establishments, and industrial plants, whether employed by utilities, jobbers, dealers, contractors, furniture and department stores or manufacturers' distributors, will be afforded the opportunity, locally or near by, for the intensive training needed to go out and do an effective job.

Results are being obtained which, even under present conditions, make the old methods of selling seem impotent. Reported here in tabular form are data that should prove that the "new approach" is effective and justifies adoption by those interested in improving illumination, wherever used.

The significance of the figures is emphasized in the remarks accompanying each table.

Although the new technique of selling is believed to be the greatest single element that is creating the unusual customer response, internal and intertrade co-ordination and organization are absolutely essential to getting one's share of the new lighting business to be had.

Experience on all of these properties shows remarkable agreement on the following principles, policies and essentials of organization:

It is a big mistake to put domestic lighting activities under the merchandising department or divorce them from similar activities in the commercial and industrial fields. All three branches of lighting should be under a lighting director who is not only a good lighting salesman but a man with executive ability. The department should be a separate unit, required to stand on its own feet, and should be gaged by its energy revenue-producing and good-will-building ability.

Merchandise departments may sell more lamps, but total usage is not necessarily increased thereby. Records show that consumption and revenue do not increase proportionately with connected load, unless careful consideration is given to esthetic values and eye comfort.

Active executive support is one requirement that every lighting group embarking on greater lighting activity has found absolutely essential. Opin-

[*Continued on page 28*]

*See pages 21 and 23 in this issue.

Effect on Energy Consumption of Lighting Activities

Average burning hours per watt added 3.49 hours per night. (Prepared April, 1934, by Alabama Power Company)

Division	No. Jobs Checked	Average Lighting Watts Added	KW.-HR. CONSUMPTION 1 Month Prior to Installing Lighting: Total	1: Average	2 Month After Lighting Was Installed: Total	2: Average	Avg. Increase in Kw.-Hr. (Column 2 — 1)	3 Month Last Yr. Corresponding to (Col. 2): Total	3: Average	Avg. Increase in Kw.-Hr. (Column 2 — 3)
Eastern	46	274	4,055	88.1	4,296	93.4	5.2	3,837	83.3	9.9
Southern	23	344	3,535	153.8	4,290	186.5	33.2	3,266	142.0	44.5
Western	55	328	5,827	105.9	7,036	127.9	21.9	5,249	95.4	32.5
Mobile	73	324	28,086	384.7	31,633	433.3	48.6	26,897	368.4	64.8
Southeast	10	...	3,740	374.0	4,554	455.4	81.4	.....	.....	....
Total	207	317	45,243	218.5	51,809	250.2	31.7	39,249	199.2	40.6
Per cent Increase	...	...	.....	.....	.....	.....	14.5	.....	.....	20.4
Included in above is the consumption of energy from the following appliances installed within the twelve-month period: 2 percolators; 1 water pump; 2 water heaters; 1 range; 2 space heaters; 8 refrigerators and 1 dishwasher. Allowing 1,500 kw.-hr. as the monthly consumption from the above appliances, the results of the lighting salesmen's activity are as follows:										
Total	207	317	43,743	211.3	50,309	243.0	31.7	39,249	199.2	33.0
Per cent Increase	...	...	.....	.....	.....	.....	15.0	.....	.....	16.5
Customers using less than 45 kw.-hr. per month	61	261	1,792	29.4	2,620	43.0	13.6	1,859	30.5	12.5
Per cent Increase	...	...	.....	.....	.....	....	46.2	.....	.....	41.1

Note increases of 5 to 81 kw.-hr. per month per customer with average increases of 15 to 20 per cent over month prior to installing light and corresponding month in previous year. If deductions of other uses than lighting are made, the per cent increase in usage for lighting was 15 to 17 over these six divisions. Among customers using less than 45 kw.-hr. per month the increases were 41 to 46 per cent, showing relatively better results among smaller customers, although the absolute increase in usage was greater among intermediate class customers.

During the eleven weeks from April 9 to June 1 each girl averaged 271 demonstrations, 100 recommendations, 33,800 watts added load and an estimated annual revenue of $1,014. Each man averaged 243 demonstrations, 73 recommendations, 28,280 watts added load and an estimated annual revenue of $944. This indicates that there is less delay in getting action among homes than in industrial and commercial establishments.

Since this report thirteen girls have been working on domestic lighting and nine men on commercial and industrial.

Applied Version of

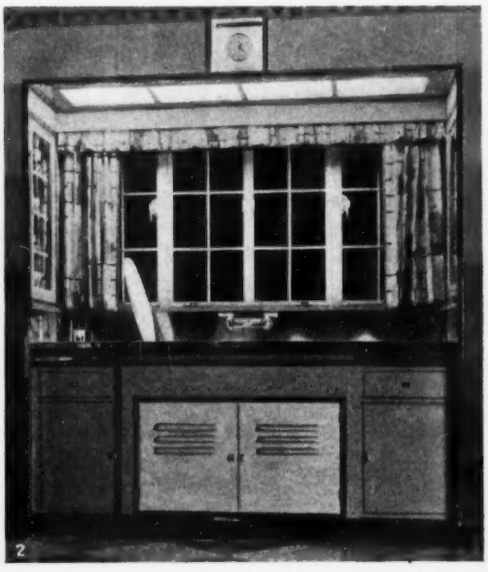
1

LIGHTING dubbed "ornamental but poorly effective" is an accusation fast fading from illumination intended to help us see. Seeing ceases to be a mere habit. Science has gripped it anew. Utility supersedes futility, attractiveness enhances aids to sales psychology, symbolism joins effectiveness. Directed light supplements diffuse general illumination. Factory, store, office and home all benefited. New elements in applied light for seeing purposes are exemplified here.

1. A touch of garden along with comfort seeing. This library corner finds reading easy and inviting with a 150-watt or even a 100-watt bulb in the lamp if general illumination is not less than one-tenth the local.

2. Daylight at all times for the kitchen tasks. Built-in soffits over sink and worktables make the kitchen a place of pride and comfort.

3. Every niche or bare wall space can become a specialty show window. One-second perception time is the limit of the buyer hurrying along the aisle. Show windows like this behind the counters do this one-second eye-catching



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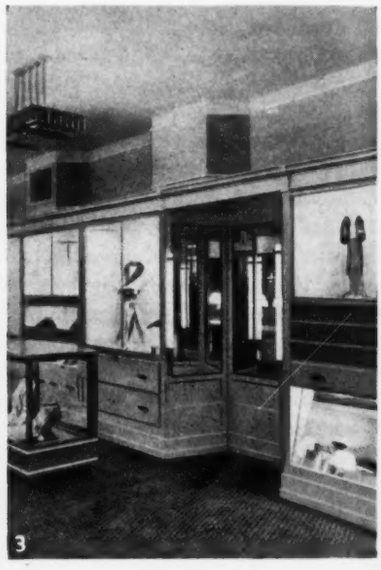

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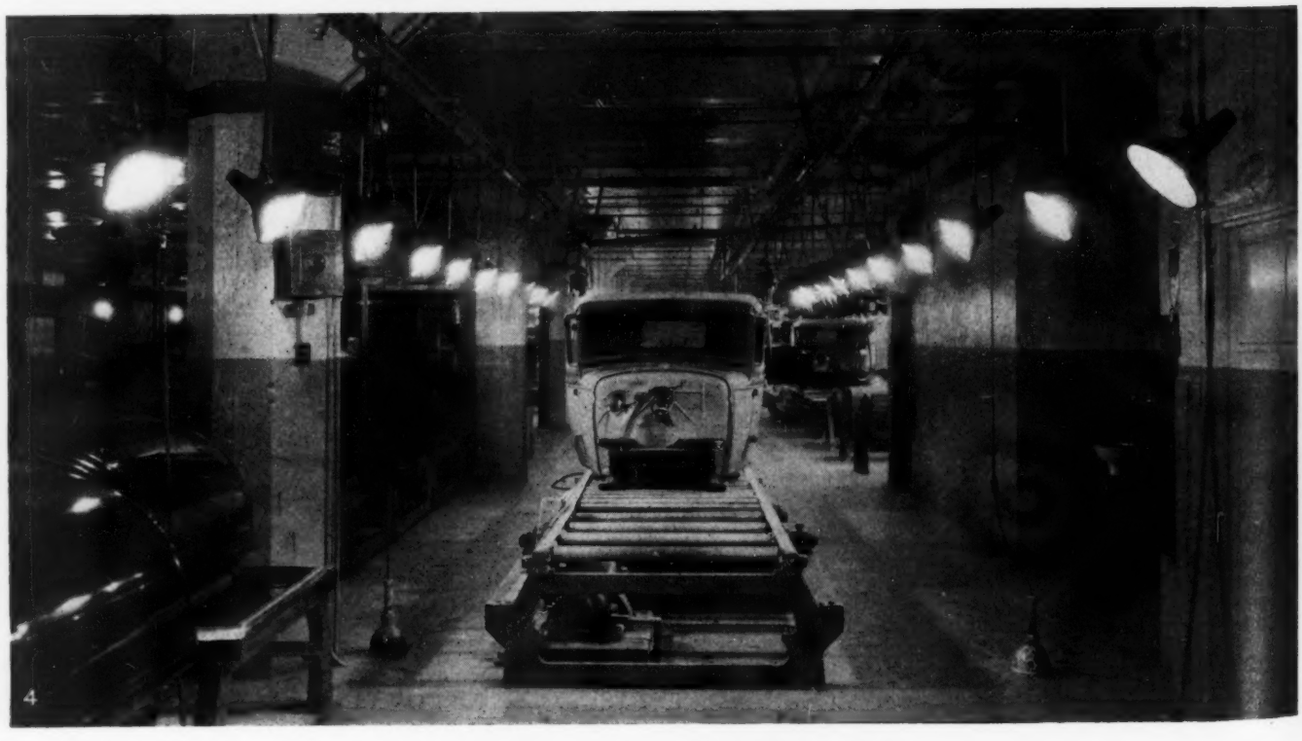


4

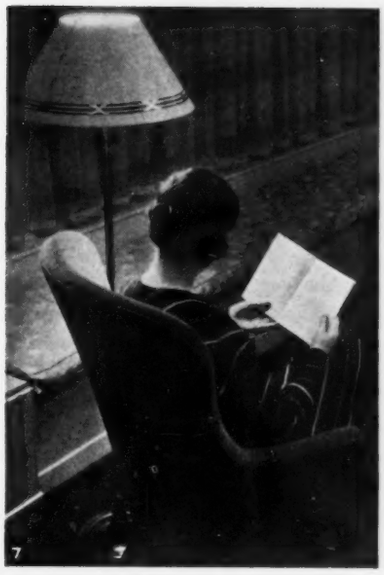
Science of Seeing

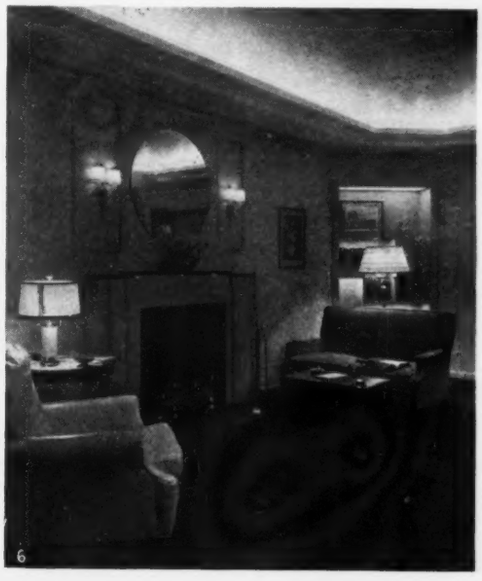
job. Three-light lamps in the ceiling. Tubulars at the try-out mirror. Note also (lower right) the mirror for viewing shoes as worn.

4. Body painting and finishing with light where it's needed. Twenty spot lamps at 5-ft. spacing with 300's give 60 to 100 ft.-candles to show defects.

5. Local light moved to the job in an otherwise dim corner. Spotlight may supplement general illumination effectively in many production, repair and inspection jobs.

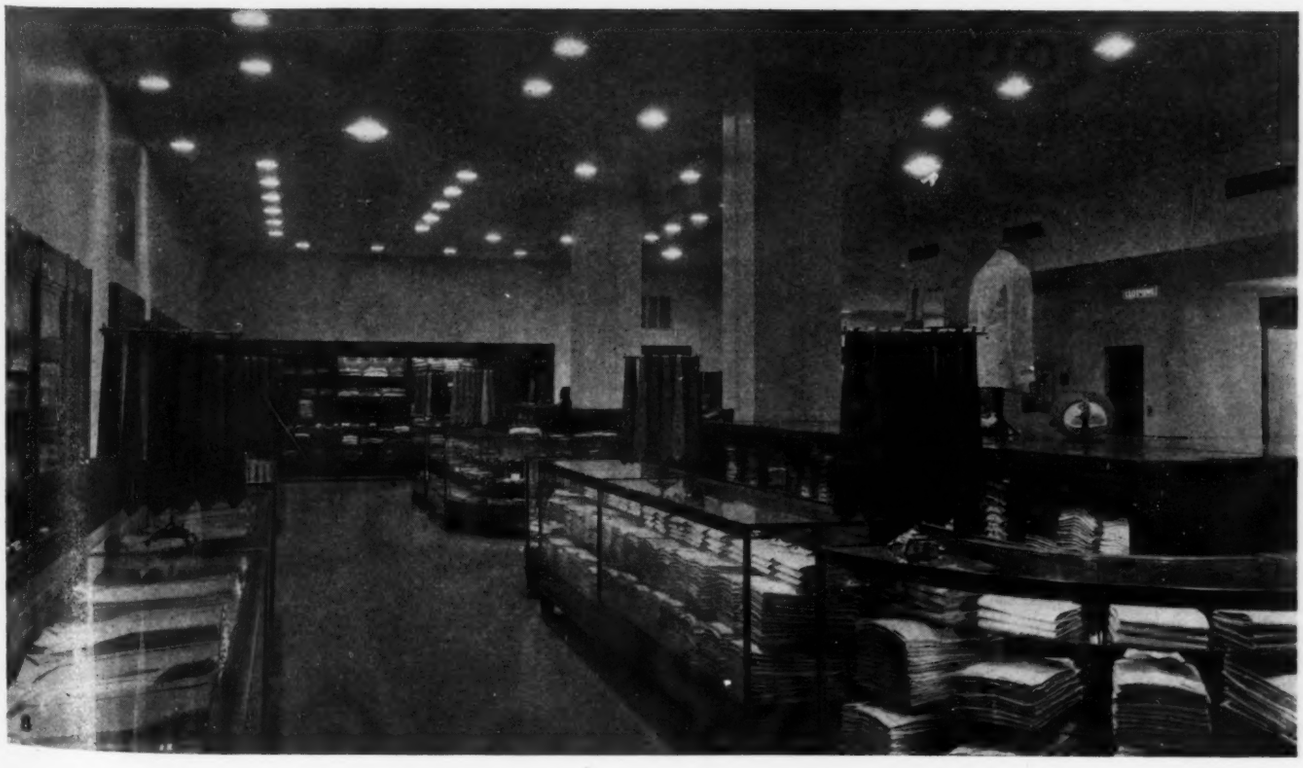
6. Light to see with and light to be admired. Two 60-watts in the table lamp for critical reading. In the floor lamp three 40's for direct and 300 for indirect. Cove or panel lighting on the ceiling and soffit lighting for the book alcove or over windows for evening simulation of daylight.





7. I.E.S. study and reading lamp gives (with 100-watt bulb) a high level of glareless and comfortable lighting for the seated occupation. Prevents eyestrain from excessive contrast of general and local light.

8. Trend in retailing is toward directed or localized light. Built-in ceiling lens-units over the showcases, where sales are made or lost.



ions of various executives frequently differ. Their attitudes have to be co-ordinated, otherwise the persons on the firing line find themselves forced to swerve from one policy to another without much progress.

Patience on the part of executives will have to be developed. Usage of energy and revenue do not increase immediately after salesmen commence contacting customers. The new approach hardly permits a man or woman to make more than three demonstrations a day, and possibly less in the industrial field where securing a hearing, assembling interested individuals, more complex problems, etc., make the task more difficult. Recommendations have to be followed within three weeks by call-backs, sometimes several to the same customer, before the suggestions are applied. Experience shows that increased usage lags at least three months behind the active starting of lighting activities, and even longer if started in hot weather. Immediate results cannot be secured.

Another administrative problem is to co-ordinate other members of the local trade with utility activities. To their great dismay, some utilities which have established an excellent organization, carefully selected and trained salesmen, and won public response to the extent that they were ready to improve their lighting, did not get the initial results to be expected. The local trade, including jobbers, dealers, contractors and department stores, had not been geared into the activity and the customer's interest waned because those who supply equipment, do wiring, etc., had not made known their readiness-to-serve and had not made it easy for all customers to buy and install the type of lighting equipment needed to produce the results demonstrated.

Co-ordinating of trade interests should be done before any sales representatives are employed and trained.

Not a one-man job

Lighting sales is not a one-man job. Neither can a company hire 50 or 100 people immediately and have them functioning as a smooth machine tomorrow. But in any system that comprises more than 10,000 domestic customers and 7,000 commercial and industrial customers there should be a minimum of, say, five commercial and industrial lighting representatives and five residential representatives. To start it has been found best to concentrate the initial staff in one community or limited section, later distributing these persons over larger territory as the nucleus for developing other trained crews.

To secure truly gratifying results there should be enough representatives in a district so that all except

[*Continued on page 89*]

Residential, Commercial and Industrial Results

Cumulative figures for First Ten Weeks Lighting Activities in Quincy, Ill. (Central Illinois Public Service Company)

	Man-Days	No. Demonstrations	No. Call-Backs	Kw. Recommended	Known Kw. Added	E.A.R.[c] From Known Kw. Added	E.A.R. When 50%[b] Recommended Installed	Known Pieces of Equipment Sold	Known Dealers' Sales*	Demonstrations[e] per Man-Day	Call-Backs[d] per Man-Day	No. Watts Recommended[e] per Man-Day	Known Watts Installed[f] per Man-Day	Added Wattage per Man-Day (When 50% of Recommended)	Dollars[g] per Man-Day
Domestic—Four Girls Act as Customer Contact															
Week of															
A 5-14-34	16	43	3	22.4	1.8	$54	$336	0	$0.00	2.60	0.18	1,400	112	700	21
B 5-21-34	36	95	26	43.8	2.9	87	657	0	0.00	2.60	0.75	1,217	80	608	18
C 5-28-34	52	135	54	81.2	6.7	201	1,218	1	7.95	2.58	1.03	1,561	128	780	23
D 6- 4-34	72	190	88	106.1	11.1	333	1,590	11	35.35	2.63	1.23	1,473	154	736	22
G 6-25-34	132	337	256	174.3	25.5	765	2,613	96	283.84	2.55	1.93	1,320	193	660	19
J 7-16-34	188	463	360	224.0	29.1	873	3,360	169	352.12	2.46	1.91	1,191	155	596	17
Commercial and Industrial—Four Men Engineered this Work															
5-14-34	14	42	13	28.3	2.6	$130	$710	0	$0.00	3.0	0.9	2,021	185	1,010	55
5-21-34	34	110	53	63.7	8.3	415	1,595	7	29.00	3.2	1.6	1,873	257	936	46
5-28-34	50	161	88	87.8	17.4	870	2,197	10	82.00	3.2	1.7	1,756	348	878	44
6- 4-34	69	213	135	120.7	21.1	1,055	3,019	27	127.00	3.0	1.9	1,749	305	874	43
6-11-34	84	264	165	144.1	26.6	1,330	3,604	27	127.00	3.1	1.9	1,715	315	857	42
6-18-34	102	312	212	164.5	31.9	1,595	4,114	59	241.00	3.0	2.0	1,612	312	809	40
6-25-34	122	373	264	199.8	48.2	2,410	4,997	77	468.00	3.0	2.1	1,637	395	818	41
7- 2-34	138	406	307	213.3	53.7	2,685	5,335	87	691.00	2.8	2.1	1,545	389	772	39
7- 9-34	158	469	341	245.0	60.7	3,035	6,129	95	760.00	2.9	2.1	1,550	384	775	39
7-16-34	178	486	384	250.6	66.4	3,320	6,269	109	859.00	2.7	2.1	1,407	373	703	35

(A) Two of four girls poorly qualified for work.
(B) Transportation problems.
(C) Recommendations running good.
(D) Many cancellations due to heat.

[c]Based on $30 per kilowatt added for domestic load; $50 for commercial and industrial.

[b]Experience indicates that with judicious recommendations at least 50 per cent are installed.

[e]Par is set at 3 per girl-day on domestic; 3½ per man-day on commercial and industrial.

[d]Par is 2 per man-day or per girl-day.

[e]Par is 1,340 per girl-day for domestic; 1,200 per man-day for commercial and industrial.

[f]Ultimate par is 660 per girl-day for domestic; 600 per man-day for commercial and industrial.

[g]Based on 50 per cent of recommended wattage (see footnote [b]).

*Exclusive of lamp bulbs.

Demonstrates the fact that training of customer contacts only lays foundation. No company should expect to attain real results in less than three months. The first few weeks are required to get under way.

Three to 3.5 demonstrations per day per contact person appears correct, but may not be attained in hot weather. Call-backs or follow-ups within three weeks after demonstrations are essential to getting recommendations applied and should be built up.

Recommendations should be made with discretion or customer will not follow. Immediate additions are largely additional or larger lamp bulbs. Subsequent additions are influenced by call-backs and readiness with which customers can secure equipment. If trade is not previously co-ordinated to tie in with lighting activities, so proper equipment is readily available to customers, the urge to improve lighting will wane.

Pushing up wattage per socket does not necessarily increase consumption. Esthetic and illumination effects, such as ratio of general to local intensity, must be considered to induce greater usage of light.

Readers Congratulate Us

New Electrical World Excites Favorable Comment From Readers and Advertisers — They Like the Plan, the Style and the Appearance

WE ARE glad to record a very favorable reception to the new ELECTRICAL WORLD. Letters, telephone calls and personal contacts attested to a very hearty reception to the new plan of publishing and to the new make-up and contents of the magazine. The comments speak for themselves and a cross-section of the letters received is printed to indicate the variety of expressions obtained from those served by the publication.

Needless to say, this reception encourages and stimulates the publishers and editors. They are determined to accomplish the plans outlined and are now assured of the fullest possible co-operation from readers and advertisers. There is a new note of confidence and courage sounding in the industry, and ELECTRICAL WORLD will reflect this attitude and stand solidly with the industry in its plans for advancement and improvement. The new ELECTRICAL WORLD is significant as a sign of the revived spirit and attitude of the industry. Neither the magazine nor the industry will fail to grasp the opportunities that lie at hand.

American Gas & Electric Company

In my mind there is no question but that you have materially improved both the "make-up" and the subject matter of this periodical. I frankly have no suggestions to offer at the present time, but I believe that at least from the utility standpoint, if you continue along the lines indicated in the September 1 issue, you will secure a more interested class of readers in the utility industry. I know that I will be much more inclined to look the WORLD over more carefully, if it is to appear in the form of that number, than I have been in the past.

H. M. SAWYER,
Vice-President.

Cleveland Electric Illuminating Co.

The new set-up of the ELECTRICAL WORLD is, I think, an improvement. I like the three-column make-up. A narrow column is easier to read. Running editorial matter into the advertising section is good, as a reader like myself will occasionally see something of interest in an advertisement which would otherwise be missed. A larger number of short articles—consequently greater diversity—should appeal to your readers. I like it.

G. E. MILLER,
Sales Manager.

Ohio Public Service Company

I am very favorably impressed with the new make-up of ELECTRICAL WORLD. The appearance is much improved, and if the contents continue to maintain their past excellence I am sure all readers will be pleased.

T. O. KENNEDY,
General Manager.

Virginia Electric & Power Company

My congratulations on the improvement which has been made in the form of the ELECTRICAL WORLD, as indicated by the first week's issue. It seems to me that the change has broadened the coverage of the magazine considerably and makes it seem like a much more live publication even than it was previously.

E. S. FITZ,
General Manager.

Charles H. Tenney & Company

I like the new set-up and in my opinion the changes have improved the ELECTRICAL WORLD. Your paper is of great service to me and all articles which have direct bearing on my particular work are read and have been extremely helpful. Whether you had changed it or not, I consider it number one of the electrical publications to which we subscribe.

CYRUS BARNES,
General Sales Manager.

Westinghouse Electric & Mfg. Co.

I have looked over the September 1 issue of the ELECTRICAL WORLD very carefully, and *it looks good to me.* I like the new arrangement very much better than the old.

R. A. NEAL,
Sales Mgr., Central-Station Dept.

Central Hudson Gas & Electric Corp.

I think the spirit behind this new scheme of publishing ELECTRICAL WORLD is to be commended, and judging from the accomplishments of the McGraw-Hill people in the past, feel sure that you will obtain the results which you expect.

H. E. DEXTER,
General Commercial Manager.

Columbia Gas & Electric Corporation

I think you have made a most progressive and constructive step. Particularly do I like the idea that you will deal with personalities in a larger measure. Informal interviews with outstanding leaders, such as those from Mr. McCarter and Mr. Liversidge in the current issue, cannot help but assert a very strong influence on the thinking of the whole electrical industry.

PAUL S. CLAPP,
Vice-President.

New York Edison Company

I am very favorably impressed with this issue. I am glad you have not changed the size of the magazine, except as to its number of pages, to which result the advertisers have generously contributed.

I like the make-up of the paper and the diversity of the articles contained in this particular issue. I think "sandwiching" the advertising material between what might be called the "departmental" sections is so arranged that it does not interfere with the reading material, and I should think the advertisers would welcome this innovation. I believe, too, that this will afford readers a better opportunity for studying the advertising pages as well as reading matter.

I like the constructive note of the editorial outlining the policy of ELECTRICAL WORLD. Altogether, I think the publishers have made a forward step, and I hope the paper will continue to represent in a constructive way the electrical industry and that the optimistic note sounded in this issue may be a prophecy that in the course of time will be an accomplished fact.

FRANK W. SMITH,
President.

General Electric Company

I could not help but be impressed very favorably by the excellent make-up of the September 1 issue of the ELECTRICAL WORLD. The new arrangement of articles and editorials strikes me as being business-like and easy to read.

That is an excellent article by Mr. McCarter and I hope that you get similar articles from other leaders in the industry. The intimate interview about Horace P. Liversidge is an excellent contribution and, of course, I am heartily in sympathy with the article "Utilities Must Add Capacity."

On the whole, this issue of the ELECTRICAL WORLD is very uplifting and encouraging. I do not feel that putting the publication on a biweekly basis is any great disadvantage to the reader.

M. O. TROY,
Manager Central-Station Department.

Okonite Company

I was quite agog to see the new format of ELECTRICAL WORLD as it appears in the September 1 issue. I think this make-up is an improvement over the old one and I

[*Continued on page 90*]

Economical Factory Drives

Keeping the Power in the Wire Has Given Individual Drive Predominance, but Group Drive Is Best for Some Conditions

By C. W. FALLS
Industrial Engineering Department,
General Electric Company,
Schenectady, N. Y.

In the last analysis each industrial plant should use the type of drive best suited to its operations. This requires an engineering analysis of each plant. Salient features of this analysis are outlined in this article.

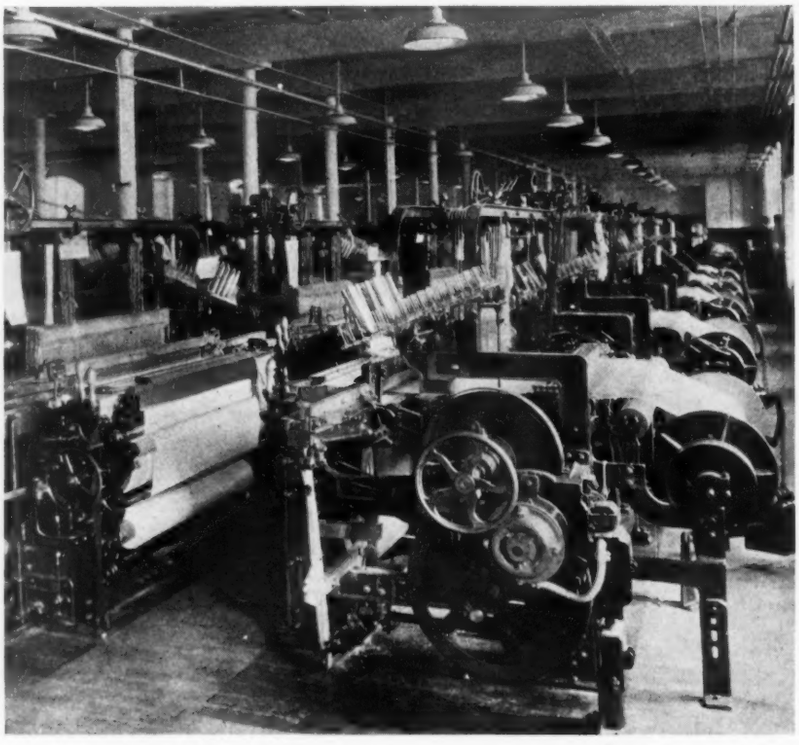
THE slogan "Do It Electrically" has received some condemnation recently on the grounds that it promotes excessive investment in small motors and accompanying equipment. At the same time, the reliability of the small motor has been impugned, as contrasted with larger motors. It hardly requires an economist to predict that types of drive which are actually uneconomical, as a whole, cannot be expected to survive in these times. It is also safe to say that the simple small electric motor has won an enviable place as a faithful and thoroughly reliable servant of industry.

When thinking of "individual" drive two sorts of applications present themselves. One involves the kind of machine to which the motor should or must be direct connected; for example, machines operating at speeds higher than can be obtained with reasonable life by the use of mechanical transmission. One engineer has described this phase of the matter in a striking way, thus:

A notable trend in the motorizing of machines is the tendency to *keep the power in the wire to the last inch.* This seems to be a logical trend, for power in the wire suffers no appreciable loss, does not have to be lubricated, spoils no goods in process, is wearing out nothing, makes no noise and does not obstruct light. Here is power, over there is work to be done; the gap can be bridged with mechanical devices, or the power can be wired up so close to the work that no mechanical devices intervene. The net results of this move have been (1) a reduction in power losses, of relatively minor importance; (2) a reduction in maintenance and lost time cost, very marked, and (3) the choice of the best type of motor and control for each subdivision of the work, a matter of considerable practical value.

The other sort of application involves those machines which may be driven readily either by an individual motor or in a group by a larger motor; for example, a spinning frame in a textile mill. There is little room for discussion regarding the first class of application. It is this second class only about which there is much question.

Some of the more important factors to be considered in coming to a decision as to whether a group drive is preferable are here outlined. No claim is made that every factor has been covered, and for the sake of brevity figures covering the many possible examples are omitted.



Exact speed, unobstructed overhead and cleanliness make individual drive ideal in textile weave shed

Each Crompton & Knowles silk loom at Lorraine Manufacturing Company, Pawtucket, R. I., is driven by an induction motor with three-point suspension.

Initial cost

Group drive is usually lower in initial cost:

(a) Where there are very compact groups of machines running continuously or simultaneously.

(b) With compact groups of machines which, because of their diversity factor in operation, may be driven by a single motor of much smaller rating than the combined capacities of the motors required for individual drive.

Individual drive will usually have lower initial cost where:

(a) The driven machines are widely separated.

(b) The roof construction will not safely support line shafting.

Operating (energy) cost

Group drive may involve a lower energy consumption if the driven machines are compactly arranged, the transmission devices as efficient as can be obtained and the total load of the group constant enough to keep the motor running close to its rated load.

Individual drive may be more favorable as to operating cost than group drive:

(a) Where many machines operate intermittently or at infrequent intervals.

(b) Where much overtime work, involving a few machines, is carried on.

(c) Where long lines of shafting are necessary to reach separated machines.

Maintenance—Considering only the cost of keeping the equipment running, a number of small motors will usually prove less expensive to keep in operation than a large motor with its complement of mechanical transmission equipment.

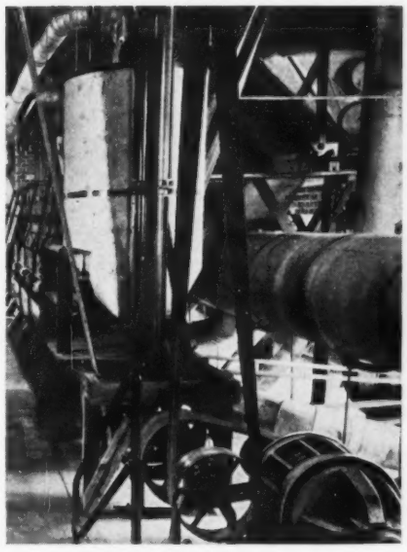
Production—In many installations it is easily possible to increase production by using individual drive. This comes about:

(a) By closer speed regulation, through reduction or elimination of belt slippage, giving higher average speed.

(b) Through less wholesale interruptions from breakdowns.

(c) Where elaborate or complicated control of the individual machine is desirable.

(d) Where remote electrical control is used, thus leaving the operator free better to observe the work.



Group drive chosen for seasonal job of cotton gin

100 and 125-hp. induction motors drive, respectively, four 80-saw and five 80-saw gin stands of the type shown at Hall Brothers Gin, Mathis, Tex. The compactness of the stands and the high load factor for seasonal use made this peculiarly a group drive case.

(e) Where the size of the work is such that it is easier, or necessary, to use portable tools, which with individual drive are moved up to the work.

(f) By ability to arrange individually motorized machines more logically with respect to the type of work, and to change the arrangement quickly to meet changing work conditions.

(g) Because the operator feels safer and gives less attention to the drive itself.

(h) Where the speed of the individually motorized machine is adjusted to the best speeds at each part of the cycle.

Working Conditions—It is generally admitted that working conditions are inherently best with individual drive. Better lighting and ventilation, less dirt and oil and a greater degree of safety are of considerable importance.

Quality of Product—Individual drive very often can affect favorably the quality of product through maintenance of exact speed, either constant or adjustable, through better working conditions and greater cleanliness.

Other Considerations—Necessity for clear overhead space for cranes sometimes makes individual drive imperative. In like manner, the periodic testing of each machine is rather awkward to do without individually motorized units and jack-type switches.

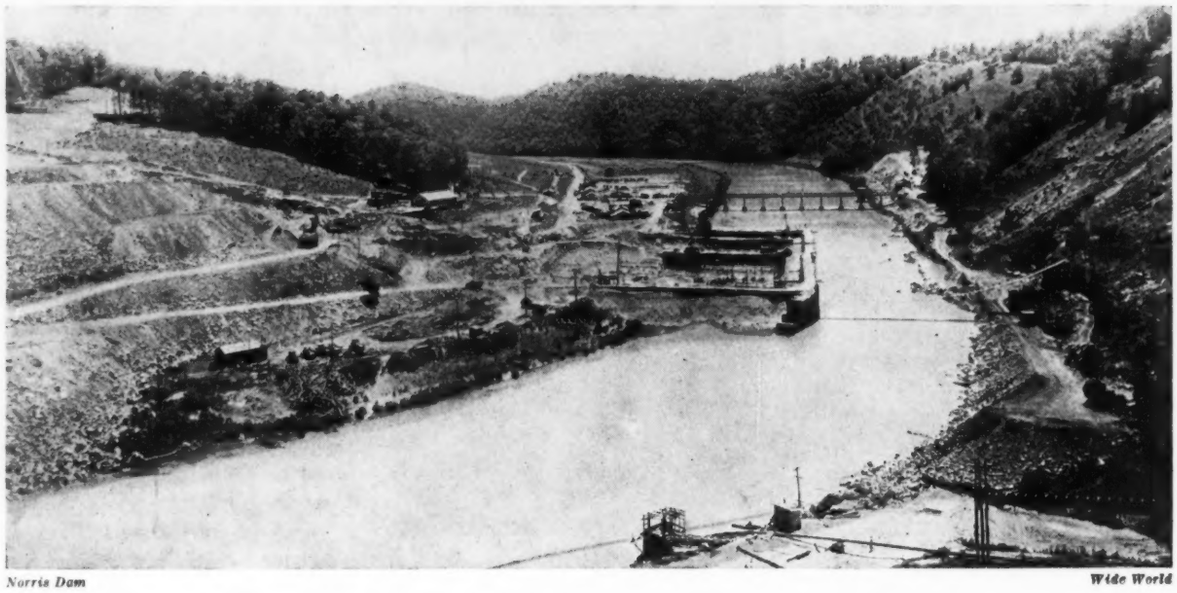
In choosing the best drive arrangement for today's plant—and anticipating tomorrow's conditions—it is evident that no one or two factors should be the criterion. A small increase in production or quality of product may easily outweigh any saving in power or initial investment. Working conditions and safety measures may outweigh most other factors. Ability to shift machines quickly to meet changing production requirements may be the very essence of survival in the future, as it has been with many plants during the past few trying years.

In the last analysis, each plant should use the type of drive or combination of types best suited to its peculiar conditions. An advantage of one type must be weighed against an advantage of the other, including those factors not ordinarily expressed in dollars, but which greatly affect workman and manager alike. The arrangement finally chosen should reflect the best compromise of all the factors.

Malcolm Muir Calls for Reassurance

EVERYTHING ESSENTIAL to a forward surge of business is at hand except the necessary confidence in the future. Our banks are bulging with excess reserves, hungry for employment in industry. Sorely needed modernization and repair of factories and homes and the promotion of many new and improved products would require billions of dollars and absorb the unemployed. But the flow of credit cannot be released and industry cannot be revived so long as the average business man is forced to reserve every available dollar of cash assets as insurance against the possible effects of social and economic experiments which are threatened. When this uncertainty is allayed, there will be the necessary flow of money into industry.

MALCOLM MUIR,
President McGraw-Hill Publishing Company, Inc.



Norris Dam — *Wide World*

Federal Funds for Power

DURING the past few years, and especially since the summer of 1933, the federal government has been engaged in a program of vast expenditures on projects that threaten, if they do not in all cases directly constitute, competition with the private enterprises of its citizens in the supplying of electric energy. These projects fall into two broad classes.

In the first is the group of undertakings—Boulder Dam, Bonneville, Grand Coulee and the Tennessee Valley development—that look toward the generation of energy on a large scale in or within transmitting distance of territory already served by existing systems. In each case present capacity is in excess of demand by a considerable margin, and the ability of the market to absorb the additional supply within a reasonable period is gravely questioned. These additions are so great that one of two consequences seems inevitable:

(a) The investment, running into hundreds of millions of dollars, will for a period of years have to be carried at a loss to the national taxpayers, or

(b) To force sales, in order to shorten this period of loss, the government will have to sell energy at less than cost, in competition with private enterprise, and thereby depreciate the investments in the latter, made in good faith from the accumulated savings of thousands of individuals.

Many analyses of these projects have been made and published. They can here be only briefly recapitulated. The summary shows that proposed expenditures on the four major projects total $626,000,000 if only that portion of the T.V.A. development is included that is planned for the immediate future, and that of this sum about $300,000,000 has been spent or covered by contracts. If the full Tennessee Valley project is included the total is much larger, since this scheme alone is estimated to require about $1,000,000,000.

Major projects exceed $600,000,000; about half this sum has been spent or contracted for. They will be able to generate so much energy in excess of present use in their localities that either (a) they will compete with existing plants or (b) they will necessitate expensive readjustments of energy flow or (c) they will remain partly idle until consumption is greatly increased. Local municipal projects financed by P.W.A. are largely non-competitive.

According to present projects, regions now using an aggregate of 30,000,000,000 kw.-hr. annually are expected to absorb 70,000,000,000 kw.-hr. For comparison, the output of all public utility plants in the entire United States—light and power, railway, Bureau of Reclamation and others—in 1933 was 85,403,000,000 kw.-hr.

Objection may be raised that these expenditures are not exclusively for power development. In the Tennessee Valley a sociological experiment is being conducted on a scale probably unparalleled outside of Russia. There and elsewhere navigation, irrigation and water supply are involved, singly or in combination, and the portion to be allocated to power supply is difficult to estimate. In view of the emphasis on this aspect in official statements, however, it is evident that they are properly to be regarded primarily as power projects, and it is on this basis that the expenditures are being justified. Else why the reiterated references to "yardsticks"? Moreover, the published figures omit the very considerable investments that must be made by some one, be it the federal government, private corpora-

tions or municipalities, to deliver the huge blocks of energy to the load centers.

In one of the accompanying tables the output of the three Western projects has been combined and compared with present conditions in the group of Mountain and Pacific states. Such a bird's-eye view is convenient, but incomplete. It ignores the shifts necessary in the flow of energy if the increased output is to be absorbed. The proposed excess of 180 per cent over present consumption cannot simply be pumped into existing circuits in the eleven Western states and allowed to take care of itself.

This becomes evident when the projected additions are compared with the capacities now available in their respective territories. For this purpose only the major systems (100,000,000 kw.-hr. and larger in 1933) have been used, the figures being taken from the ELECTRICAL WORLD Supplement of May 5, 1934.

The available output has been taken at 4,000 kw.-hr. per kilowatt of installed generators. The assumption is conservative for that part of the country. Of the seventeen systems, four actually exceeded this amount in 1933, a year in which there certainly was no power shortage.

Grand Coulee will augment the output of seven such systems in Washington, Idaho and Montana by 256 per cent over present use.

Bonneville cannot feed northward into that area. Considered as an adjunct to the three major systems in Oregon, it will make available five times as much energy as was used in 1933.

Boulder Dam will give southern California an excess of 153 per cent.

Central and northern California, with a present margin of nearly 50 per cent, must somehow manage to absorb, over long transmission lines, portions of the surplus from Bonneville and Boulder Dam.

That the achievement of these changes calls for major readjustments along the entire Pacific coast, over a distance considerably in excess of 1,000 miles, is no trifling obstacle. Steam is definitely competitive with water power, and is also a necessary supplement. The rating of present fuel-burning plants on the coast is more than half as great as that of the water-power plants.

Financial Summary

Tennessee Valley

The T.V.A. project is being financed from a variety of federal funds. A recent compilation is as follows:

Muscle Shoals present worth	$20,000,000
Initial T.V.A. appropriation	50,000,000
To T.V.A. by Presidential direction, June, 1934	25,000,000
Cash and credit to T.V.A. subsidiaries	11,000,000
T.V.A.'s estimate of further funds to complete five-year power development now under way	205,000,000
"Definitely committed for use in Tennessee River basin by federal agencies other than T.V.A."	56,000,000
Total for T.V.A.	**$367,000,000**
Expended and to be expended immediately on six dams	198,000,000
Spent on Muscle Shoals	100,000,000
Portion of these expenditures assignable to electric power	**169,000,000**

Boulder Dam

Authorized	**$165,000,000**
Present contracts and expenditures by federal government	**85,000,000**

Bonneville

Original disbursement	$20,000,000
New allotment	11,000,000
Estimated to bring project to completion	**$31,000,000**
Contracts awarded and force-account work done	**12,000,000**

Grand Coulee

Tentative grant	**$63,000,000**
Bid awarded for dam construction	**29,000,000**

Allotments by P.W.A. $192,518,900

Up to the end of August allotments had been made by P.W.A. to publicly owned power plants and distribution systems totaling $192,518,900. This does not include expenditures by T.V.A., for which separate allotments of $75,000,000 have been made by Congress and the President. Of the P.W.A. money $146,250,000 was for five major federal projects, as follows: $38,000,000 to Boulder Dam; $50,000,000 to Fort Peck, of which flood-control and navigational aspects are emphasized; $31,250,000 to Bonneville; $15,000,000 to Grand Coulee; $12,000,000 to Casper-Alcova, in Wyoming, which is to develop 51,000 hp. The amounts are present allotments; the ultimate costs will be much larger.

Local allotments not seriously competitive

As against these large undertakings —and there are others in the offing— for which public money is being spent to supplement the present adequate facilities provided by private investments, the local allotments for municipal electric purposes are not, as a whole, seriously competitive.

The lists are difficult to trace. Figures apparently for electric construction turn out to include a large proportion of other elements which have to be eliminated in the analysis. Localities previously included vanish from later tabulations. Others as unexpectedly appear after available funds had presumably been accounted for, greatly amplifying the number.

The accompanying table is quoted from the latest official announcement with the addition of a column giving the present sources of energy. It lists

Output Summary

Tennessee Valley

Present plants in basin built for, kw.-hr	26,000,000,000
Actual output, 1932, kw.-hr	16,000,000,000
Surplus in 1932, kw.-hr	10,000,000,000
Projected plants on main stream, kw.-hr	12,500,000,000
Combined excess over output in 1932, per cent	140
Projected plants in whole valley, kw.-hr	25,000,000,000
Combined excess, per cent	220

Boulder Dam, Bonneville, Grand Coulee

Available output, existing plants in eleven Western states, 40% plant factor, kw.-hr	19,000,000,000
Actual output, 1933, kw.-hr	14,000,000,000
Surplus in 1933, kw.-hr	5,000,000,000
Prospective total when projects are completed, kw.-hr	32,000,000,000
Excess over 1933 output, per cent	180

Comparison of Three Western Projects with Present Major Operations

Grand Coulee

Project Capacity, kw.-hr	7,000,000,000
Seven major systems in same region	
Output in 1933, kw.-hr	3,307,000,000
Capacity, kw.-hr	4,800,000,000
Excess capacity in 1933, per cent	45
Excess, with Grand Coulee, per cent	256

Bonneville

Project Capacity, kw.-hr	4,000,000,000
Three major systems in same region	
Output in 1933, kw.-hr	1,069,000,000
Capacity, kw.-hr	1,350,000,000
Excess capacity in 1933, per cent	27
Excess with Bonneville, per cent	400

Boulder Dam

Project Capacity, kw.-hr	4,300,000,000
Five major systems in same region	
Output in 1933, kw.-hr	3,834,000,000
Capacity, kw.-hr	5,400,000,000
Excess capacity in 1933, per cent	41
Excess with Boulder Dam	153
Northern and Central California Three major systems	
Output in 1933, kw.-hr.	3,670,000,000
Capacity, kw.-hr	5,400,000,000
Excess capacity in 1933, per cent	47

97 P.W.A. allotments accounting for the $46,268,000 remaining after deducting the five major federal undertakings previously mentioned. A third of this sum goes to two county developments in Nebraska. Several of the items are for public institutions. Of the remaining communities about half are now being served by municipal plants; the federal allotments, whether loans or grants, are therefore chiefly non-competitive. In some instances the new funds are for improvements to street lighting or distribution systems and may bring additional loads to present plants. In other cases litigation is holding up any definite action.

Non-Federal Projects—P.W.A. Grants and Loans

City and State	Amount	Purpose	Now Served by
Alexandria, La.	$250,000	Improvements, municipal power plant	Municipal plant
Alexandria, Minn.	26,500	Alterations to plant	Municipal plant
Allegan, Mich.	410,000	Construction of plant	Consumers Power Co.
Anaheim, Calif.	15,000	Underground distribution and rebuilding	Municipal system, purch. energy
Anthony, Kan.	15,000	Improvements to plant	Western P. & L. Corp.
Auburn, N. Y.	319,000	Street lighting, distribution and addition to waterworks plant	Empire G. & E. Co.
Augusta, Ga.	1,250,000	Hydro-electric plant	Georgia Pwr. Co.
Augusta, Kan.	6,000	Installation engine and equipment	Municipal plant
Austin, Minn.	46,000	Additions to municipal plant	Municipal plant
Austin, Tex.	4,500,000	Dam for power, irrigation and water	Municipal plant
Belmont, Mass.	16,100	Extensions to substation	Purch., municipal
Blackwell, Okla.	300	Power plant stack	Municipal plant
Blue Earth, Minn.	20,500	New power-house equipment	Municipal plant
Boston, Mass.	120,000	Improvements power-house, State Hospital	.....
Bridgewater, Mass.	33,000	Turbo-generators, etc., State Farm	.....
Brooklyn, Ind.	12,000	Rebuilding distribution system	Purch., municipal
Buhl, Minn.	34,000	Improvements, municipal plant	Municipal plant
Burlington, Kan.	145,000	Plant and distribution system	Kansas Util. Co.
Burlington, Vt.	74,000	Additions to plant	Municipal plant
California, Mo.	145,000	Plant and distribution system	Missouri Util. Co.
Camden, N. J.	6,000,000	Municipal plant and system	P. S. Corp. of N. J.
Cave in Rock, Ill.	23,000	Plant and distribution system	.....
Centralia, Ill.	477,000	Plant and distribution system	Illinois P. & L. Corp.
Chambersburg, Pa.	26,100	Generator and accessories	Municipal plant
Chanute, Kan.	29,500	Turbine and auxiliaries	Municipal plant
Chicago Sanitary District.	230,000	Hydro plant rehabilitation	Own plant
Columbia City, Ind.	29,000	Plant addition	Municipal plant
Columbus, Nebr.	7,300,000	Loup river dam, station, transmission, Platte and Nance Counties	Northwestern Pub. Serv. Co.
Concordia, Mo.	47,000	Plant and distribution system	Missouri Pub. Serv.
Culpeper, Va.	160,000	Plant, distribution, street lighting	Virginia P. S. Co.
Cushing, Okla.	350,000	Plant, distribution system system	Interstate Pwr. Co.
Danville, Va.	18,000	Extension to distribution system	Municipal plant
Decatur, Ala.	350,000	Distribution and substation	Alabama Pwr. Co.
Elmira, N. Y.	162,000	Plant, State Reformatory	.....
Fairview, Utah.	11,000	Completion hydro plant and water supply	Municipal plant
Fayetteville, N. C.	35,000	Improvements, distribution system	.....
Florence, Ala.	436,000	Transmission, substation, distribution	Alabama Pwr. Co.
Fort Collins, Colo.	738,000	Plant, distribution system	P. S. Co. of Colorado
Fort Morgan, Colo.	23,500	Generator and auxiliaries	Municipal plant
Fort Pierce, Fla.	36,000	Replacement of plant	Municipal plant
Greenwood Co., S. C.	2,767,000	Hydro plant, distribution	Purch., municipal
Hannibal, Mo.	81,000	Turbo-generator	Municipal plant
Harding, Mass.	62,500	Improvement, plant, State hospital	.....
Hartford, Wis.	12,000	Addition to plant	Municipal plant
Hastings, Nebr.	48,600	Improvements, municipal plant	Municipal plant
Herington, Kan.	3,500	Transformer, etc.	Municipal plant
Highland, Ill.	25,000	Turbo-generator	Municipal plant
Hiram, Ohio.	32,500	Generating plant	.....
Hominy, Okla.	150,000	Plant, distribution system	Okla. Util. Co.
Independence, Iowa.	18,400	Engine and generator	Cent. States P. & L. Corp.
Independence, Mo.	$52,500	Improvements, municipal plant	Municipal plant
Iowa City, Iowa.	917,000	Plant, distribution system	Iowa City P. & L. Co.
Kennett, Mo.	150,000	Plant	Ark.-Mo. Pwr Co.
Knoxville, Tenn.	2,600,000	Substation, distribution, street lighting (from T.V.A.)	Tenn. P. S. Co.
Laclede, Mo.	14,000	Distribution system	Consumers P. S. Co.
La Plata, Mo.	100,000	Plant, distribution, street lighting	Missouri P. & L. Co.
Lawler, Iowa.	1,400	Line changes	.....
Litchfield, Minn.	18,000	Addition to plant	Municipal plant
Loyal, Okla.	7,100	Transmission, distribution system	.....
Ludlow, Vt.	1,300	Improvements in municipal plant	Purch., municipal
McPherson, Kan.	58,000	Addition to plant	Municipal plant
Memphis, Mo.	8,500	Installation of generator	Municipal plant
Menominee, Mich.	803,000	Plant, distribution system	Wisconsin P. S. Corp.
Middlesboro, Ky.	328,000	Power plant	Kentucky Util. Co.
Minden, Nebr.	8,000	Generator unit	Municipal plant
Monroe City, Mo.	17,000	Addition, municipal plant	Municipal plant
Morenci, Mich.	146,000	Plant, distribution system	Citizens L. & P. Co.
Naperville, Ill.	85,000	Power plant	Municipal plant
Norfolk, Mass.	19,000	Boilers, State Prison Colony	.....
Northampton, Mass.	101,000	New plant, State Insane Hospital	.....
No. Chicago, Ill.	382,000	Plant and distribution system	P. S. Co. of No. Ill.
Okeene, Okla.	48,000	Plant addition, distribution	Municipal plant
Osceola, Ark.	52,000	Engine and appurtenances	Municipal plant
Pawnee, Okla.	60,000	Generators and equipment	Municipal plant
Pecos, Tex.	2,600,000	Dam, power house, transmission, irrigation	Tex.-La. Pwr Co.
Platte Valley, Nebr.	7,500,000	Hydro plant, transmission	Northwestern P. S. Co. and others
Rhode Island.	4,000	Plant improvements, State Sanitarium	.....
Rockville Center, N. Y.	260,000	Generator in municipal plant	Municipal plant
St. Cloud, Minn.	1,229,000	Plant and distributing system	Northern States P. Co.
Salina, Kan.	6,000	Switching equipment	United P. & L. Co.
Seward, Alaska.	118,000	Plant, distribution system	Seward L. & P. Co.
Sheffield, Ala.	230,000	Transmission, substation, distribution	Alabama Pwr. Co.
Shelby, Ohio.	160,000	New power plant	Municipal plant
Silbey, Iowa.	26,000	Plant improvement	Northw. L. & P. Co.
Springfield, Ill.	160,000	New power plant	Municipal plant
Stoughton, Wis.	39,000	Generating plant	Municipal plant
Terre Haute, Ind.	20,000	Extension street lighting system	P. S. Co. of Indiana
Thief River Falls, Minn.	800	Plant improvements, lighting	Municipal plant
Tipton, Ind.	170,000	Plant rehabilitation	Municipal system
Trenton, Mo.	315,000	Municipal plant, distribution	Missouri P. S. Co.
Tuscumbia, Ala.	130,000	Transmission, substation, distribution	Alabama Pwr. Co.
Waltham, Mass.	3,500	Feeder to State Hospital	Ed. El. Ill. Co. Boston
Wapakoneta, Ohio.	146,000	Generating station	Municipal plant
Waterloo, Ala.	8,100	Distribution system	.....
Wellsville, N. Y.	85,000	Boiler house	Municipal plant
Wheaton, Minn.	5,700	Power line improvements	Federal P. S. Corp.
Worthington, Minn.	29,000	Generator in municipal plant	Municipal plant

Electric Heat Cures Rubber

Manufacturers of O'Sullivan Heels Introduce New Method of Curing With Gratifying Results in Production Economies

No claim is made that electric heat is more economical for all applications. But if a conscientious analysis is made of other plants and the organization is not bound by tradition, many cases will be found where it is preferable.

By J. V. CALHOUN and H. R. HOUGHTON

Electric Heating Engineers, Associated with Edwin L. Wiegand Company, Pittsburgh.

IN THE fall of 1932 the O'Sullivan Rubber Company, Inc., manufacturer of rubber heels, rubber soles and similar rubber products, also became interested in electrically heated platens, as it was necessary either to install a new boiler or use other means of heating at its plant at Winchester, Virginia.

The advantages of electric heat looked attractive. The initial cost and installation of the electrically equipped platen was lower than that of a new boiler. One six-opening, seven-platen press was equipped with electric heaters and automatic temperature control. Within one year after the first installation was made all presses in this plant were equipped with electrically heated platens. The present total connected load for this one operation is over 500 kw.

Benefits secured

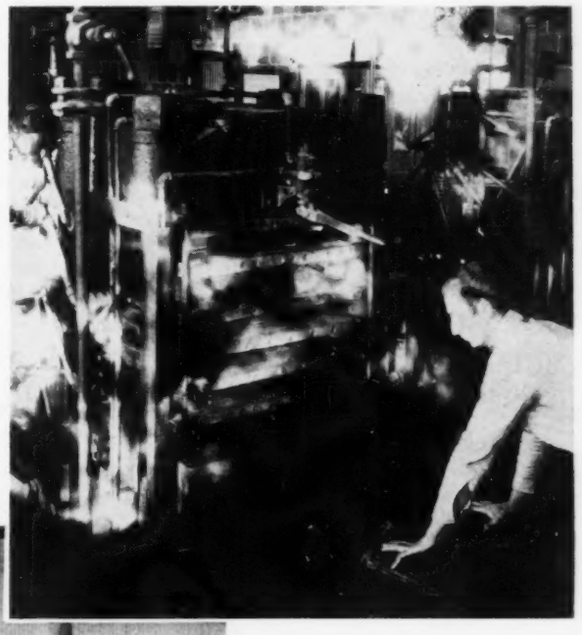
Careful records have been kept on the entire installation. Data are being recorded on energy consumption, production, rejections and quality of the cured material. Comparing the cost of kilowatt-hours consumed by the platens only against former steam costs to heat these platens it was found that a saving of $500 a month had been made. Because of 24-hour operation and high load factor the increment rate for added usage of power in this plant was very low. Other readily determined savings, due chiefly to reduction of maintenance, showed additional benefits, bringing the total savings to approximately $800 per month. The over-all cost of power per pound of rubber products produced was increased less than 6 per cent by changing from steam heated to electrically heated platens. Although the electrically heated platens represented an increase connected load of 500 kw. the increase in demand was only 200 kw. The power factor of the complete plant load was increased 11 per cent* by the operation of the electrically heated presses.

Working conditions in the press room of the O'Sullivan plant are also greatly improved, especially during the spring and summer months. Electric heat is dry and the air in the pressroom is now at a much lower relative humidity than formerly. Accident hazards have been decreased by elimination of wet and slippery floors.

Greater flexibility of operation has also been obtained, as each press is an independent, self-contained unit. Adjacent presses can readily be operated at different temperatures under automatic control and the operation of one

[*Continued on page 88*]

*This is based on dividing the change in power factor by the old power factor; the actual change in power factor was 8 per cent.



Rubber press with electrically heated platens and before electrification

Notice absence of piping and steam traps that accompanied old steam-heated presses. The indistinct view of the press in the illustration shown above is due largely to the great amount of steam in the air eliminated after steam heating was superseded.

One of a Series of Intimate Talks with Industry Executives

Shreve Discusses the Code

An Interview by

EARL WHITEHORNE

EVER since the electrical manufacturing industry received its code electrical men have been watching with intense interest. The electrical manufacturing industry code was one of the first to be signed by the President. The electrical manufacturers, therefore, have been pathfinders in this dramatic experiment in industrial self-government. For more than a year now they have been struggling with the maize of conflicting commercial, economic, political and human problems that have grown out of this sudden, sweeping attempt to co-ordinate the activities of so many separate corporate organizations and make it work.

The burden of such an enterprise always falls on a few men. Among this central group that has been working all hours, week after week, through these past months of pressure, perplexity and patience is E. O. Shreve. He came out of the West a few years ago and now is a vice-president of the General Electric Company. Much of his time and thought and energy during the past year have been going to this job of industry administration. And it is notable that a man so recently come into the national picture, and young despite his shock of iron gray hair, should have attained this leadership so soon. It is a tribute to his earnestness, sincerity and sound judgment and his intense conviction that industry organization can be made effective, if only men will sink their selfish interests for the greater benefits of common progress.

The other day I asked him how he felt about the whole situation. "Are you really getting anwhere?" I said. "When the dust has settled and the sweat and tears have dried, will the industry be any better off?"

Shreve said: "We are dealing with a fact and not a theory. The code is with us. It is the law. The problem is to make the most of it. Frankly, I am not sure I would advocate a code. But I do advocate organization for industry progress through an orderly self-government. Having the code, therefore, I say, let's build it into what we need for self-control and the stabilizing of the electrical business.

"The electrical manufacturers," he continued, "for several years have been one of the best-organized industries in the country. Yet there are those who heretofore have had no faith in organization. Now, under the law, they have been obliged to meet with their competitors and work together on some of their most urgent problems. Out of it a mutual understanding is developing and a definite relationship between them that is exerting a constructive influence despite the many temporary unavoidable misunderstandings and mistakes. This constructive influence will continue to benefit the industry long after the NIRA has gone."

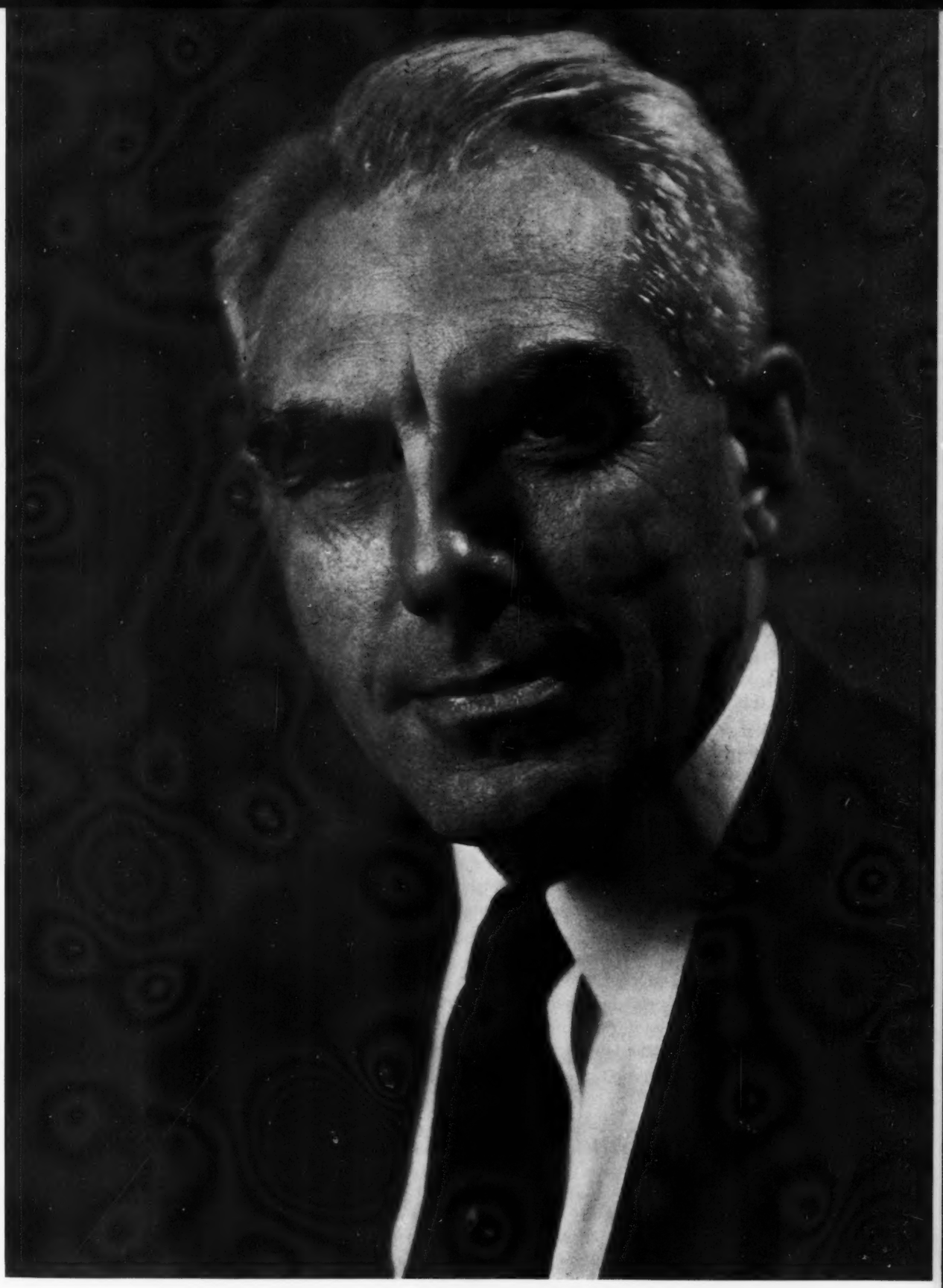
Mr. Shreve frankly admits the turmoil and chaos that at times has been almost overwhelming as the code has been evolving and men have labored to fit it to their use. "How could you expect," he asks, "to set up so intricate and sensitive a mechanism, surcharged with human emotions, and have it otherwise?" But he lays the chief blame for any failure so far to industry itself. Industry has been a bedlam of many voices—separate associations, chambers, committees. Had industry already been intelligently organized, when the emergency arrived, it could have advanced ideas and a program for a national industrial co-ordination that might have made the NRA and all its codes unnecessary.

In spite of all that, however, Shreve believes that much has been accomplished that will have lasting benefit. All manufacturers have been compelled to study their costs as many of them never had done before. The knowledge they have gained will stabilize their operations. Trade practice rules have been written into supplemental codes that have been corrective and constructive. It has stiffened the backs of many men who formerly could not resist the wiles of customers and the fears of their own salesmen. Some groups in industry put the open price policy in force before they were prepared, and the hands of those who wanted to play fair were tied by those who wouldn't. But they will learn, and wider acceptance will bring greater progress. It all takes time.

"Our greatest single anxiety," he said, "lies in the fact that Washington needs men to operate these codes. The work must be done and men will be hired to do it. And unless industry wakes up to the fact that it must continue to furnish able men to occupy the important posts in NRA and code administration, it must expect to deal with any political appointee the government can find to take the job. That means, of course, that every organization in the industry must face the possible need for drafting its own men of background and ability to do this work whenever and wherever it is necessary for the common good. This is not yet generally appreciated."

"Would the majority of the electrical manufacturers vote to quit the code if they could get rid of it?" I asked.

"I don't think so," Shreve replied. "Some are impatient. But if it were not for the political angles and uncertainties that beset us right now, great progress could be claimed and would be generally recognized. Even so, I believe that a majority would vote to retain the code."



EARL OWEN SHREVE, vice-president of the General Electric Company, a rising leader in the electrical manufacturing industry and one of the central group of the National Electrical Manufacturers Association that is guiding and administering the NEMA code and building up a mechanism for self-government for all electrical manufacturers

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Federal Court Stands for Justice

AT LAST the courts have spoken about unfair government competition. Federal Judge A. L. Reeves in Kansas City, in a case involving a P.W.A. grant for a municipal plant at Concordia, Mo., which is already served by a private utility, ruled that "the administrator of public works had no constitutional authority to aid the defendants in the construction of the project, and if it were intended by Congress to promote that character of construction work under the industrial recovery act, then such purpose infringes upon constitutional inhibitions and is invalid."

The state has exclusive right to control the manufacture of electricity, said Judge Reeves, and "it must follow that if Congress has no power to control the generation of electricity, as in the instant case, it would have no authority to grant aid to the construction of a plant over which it would have no legislative authority." These broad constitutional grounds took no account of the unfairness of a free gift of 30 per cent of the money, the low interest rates and the vested rights of the existing private utility. This decision should have a powerful influence upon the unfair competition policy heretofore encouraged by the government. Courts state the law and the law is based upon justice.

Farmers Demand Electricity

THE chief executive of an agricultural state recently said: "What are we going to do about those farmers who want electric service? The politicians and the utilities have sold the idea. They demand electric service and entertain no excuses stated in economic terms. The utilities can go to court to protect themselves from uneconomic service. But we cannot overcome the political pressure."

This situation is duplicated in many areas. The farmers demand and will get electric service through political action. Suggestions have been made that bond issues be made to finance rural lines and place them in the same class as good roads. Another suggestion is to use a combination of highway lighting and rural service to reduce unit costs. Yet, all these suggestions do not obviate the fact that most of the service to farms is expensive and unprofitable. Only through several years of load and equipment sales development can this class of business pay its cost. But political pressure takes no account of cost, and these voting farmers demand service at once.

Possibly a feasible plan can be developed to share costs during the development period. The administration might supply the money for building the lines and purchasing the equipment for the farmers and the electrical industry might sell the service, build the lines and sell the equipment needed by the farmers. As part of the recovery program, no better business proposition and no better political move could be made than to endeavor to electrify the farms of the country. This is a billion-dollar project that will get action in consumer and durable goods far in excess of the results obtained by the "power yardsticks."

If fixed charges can be made low and if capital can be made available, then the utilities and manufacturers can be placed in a much better position to push rural electrification and get it through the development stages to where it can carry its costs. There is every incentive, therefore, for the industry and the government to investigate the possibilities of a partnership plan that can solve this pressing economic-political problem. The initiative should be taken by the electrical industry.

Management Is Competitive

A RECENT statement of a utility manager affords a sound guide for executive action in the utility business. He said: "I cannot afford to spend much time worrying about national affairs. My job is to see that my customers get the maximum service at the lowest reasonable price. And, since each manager has the same opportunity and the same task, I am in competition with them for results."

He is right. The basic problem of utility management is a local service and business-getting task, and this must be done under keenly competitive conditions—with other managers, with municipals and with the government "yardsticks." No matter where located, how organized or who owns the property, the present specifications for managerial efficiency are the same. Results of utility operations are public and all managers must compete for a record in service, in sales and in rates.

It is a matter of indifference to the public that owners, employees, managers and investors in private utilities regard the unfair government competition as a rank injustice. The debate about public and private ownership causes more yawns than interest. The citizen is indifferent and uninterested unless he sees a direct effect

upon his pocketbook or comfort. Price, quality of service, better use of his service and equipment—these things interest him. He wants a low price, he wants good service, he is receptive to suggestions for the purchase and use of more service and more equipment. He has his own yardsticks for measuring values in the utility business. The utility manager must give him these values if the customer is to pay the cost cheerfully and willingly and if confidence in and friendship for the utility are to exist. If this customer problem is solved on each local property there need be no fear of injustice in national affairs. Government competition will die for lack of public support when facts and service combine.

Managers of all utilities are now challenged to show competency. They must get results if they expect to survive. For service will increase and electrical equipment will sell in the future. If private utility managers do not make these available to the public on terms that the public believes to be reasonable there will be no alternative to new management and possibly new ownership. The public is sold on the electrical idea; it is not yet sold on private utility management.

Graybar Faces a Principle

TO THOSE who have long pondered the cost of distribution, the recent announcement of the Graybar Electric Company is of great interest. For 65 years this company has specialized in distribution. It has been the only wholesaling organization providing a national distribution for electrical products, selling them through 74 branch houses. It is therefore an institution in this industry.

Some twenty years ago, however, Graybar—or Western Electric as it was then—went adventuring in the merchandising of domestic appliances bearing its own brand, gradually building up a full line of its own appliances and, therefore, attempted to combine the business of manufacturing and promoting a private brand with the very different business of distributing the products of other manufacturers. It has finally decided that these two activities are not compatible and has discontinued the Graybar brand. From now on the appliance line for each Graybar branch will be built up as best adapted to its territory. Some products will sell in all branches, some not.

The significance of this abrupt change of policy will not be lost on electrical men. In a word, it is striking evidence that manufacturing and distribution are separate functions, each calling for a high degree of specialization. It argues that if Graybar cannot combine the production and promotion of a private brand with an efficient job of distributing a full electrical line, no manufacturer can well expect to establish a distribution for his own products as efficiently as an experienced wholesale organization. One job calls for production-minded, the other for distribution-minded men. And there is a difference.

Graybar also has made an important gesture of decentralization. From now on all Graybar houses will not necessarily be selling the same refrigerator, the same flatiron. Here is a recognition also of the fact that local markets do differ, and what is best for one may not be right for another. Graybar is thus providing a flexibility in the selection of products for each territory that it has not had before.

It takes courage to admit a fault, to break a tradition in order to support a principle. But the principle here is vital. It says that distribution is not a part of manufacturing, that distribution costs in the electrical industry can only be reduced through specialized knowledge and organization.

A New Start for Street Lighting

STREET lighting used to be a local affair. A power company would dicker with a mayor and council for a contract to light the city streets. The extent and brilliance of the illumination depended on how much the city fathers believed in the bright lights. But the automobile has changed all that.

Today street and highway lighting has become a vital factor in a pressing national problem. Last year 31,000 people were killed in automobile accidents. In any eighteen months nowadays traffic takes more lives in America than our total killed in battle in the World War. One-half of these accidents take place at night and one-third of these night casualties would be prevented if the streets were adequately lighted. Before and after records for many experimental and permanent sections of highway have consistently demonstrated that this is so.

Eventually public opinion will become aroused to the enormity of this useless waste of lives and money and demand that adequate illumination be provided. Then it will be done. Money will be allocated from the gas tax revenue in every state to install and maintain protective lighting on the primary highways. The question is how long must these unnecessary tragedies, this avoidable destruction of property, continue before action is taken?

The power companies have a special interest and responsibility in this matter, for the way at last seems clear. The sodium and the new high-pressure mercury lamps have greatly advanced the art of lighting streets for safety. Demonstration highways—notably those in New Jersey—have built up experience data that are impressive and appealing. It remains now to extend this demonstration work throughout the country. For when people see that the present personal hazard in night driving may be reduced and the high cost of casualty insurance relieved, public demand for the necessary legislation will then follow.

Street and highway lighting now enters a new phase. It is an idea to be sold to the public. It should be a major objective this year with every utility company in the country.

Court Bars P.W.A. Aid to Municipal

Federal court holds P.W.A. power loans unconstitutional — State jurisdiction upheld and loan not a recovery asset

Building of municipal utility plants with money loaned or donated from the federal treasury received a body blow in a Kansas City decision last week. Concordia, Mo., cannot, in the judgment of U. S. District Judge Albert L. Reeves, obtain from the Federal Emergency Administrator of Public Works the $47,000 which it arranged for the building of a municipal electric plant in competition with Missouri Public Service Company. The court declared that the permit of the Corporation Commission is a franchise entitled to the property rights protection of the Fourteenth Amendment to the Constitution. Even more significant is the ruling that Congress did not in the industrial recovery act, because it knew it could not constitutionally, do more than enact an emergency measure under the granted power to regulate commerce among the states. Inasmuch as interstate commerce is not affected either directly or indirectly by the city's project or the utility's present intrastate operations, Congress, in the opinion of the court, has no more power to grant aid in the building of the municipal plant than it has to regulate the enterprise subsequently, that power having been reposed in the state.

The court decision states that the industrial recovery act shows that the object of the loan ($30,000) or the gift ($17,000) "was not for the mere purpose of loaning money or giving away money in order to relieve distress, but it was for the sole purpose of promoting and bringing about the construction of a utility." The plans and aid promoted, formulated and granted by the administrator of the Federal Emergency Administration of Public Works being illegally founded, the plaintiff utility was declared entitled to the relief sought, which was a plea that the court reject the motion of the defendant city to dismiss the utility's bill of complaint.

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Des Moines Electric Strike Promptly Terminated

An agreement between striking employees of the Iowa Light & Power Company and the Des Moines Electric Light Company and officials of these utilities terminated the complete shutdown of electric service which threw the city of Des Moines and six other Iowa cities in complete darkness for 4½ hours on September 19. The main plant closed down at midnight, when the strike, declared by leaders to affect 90 per cent of the 150 mechanical department men of the organizations, went into effect. The strikers demanded a wage increase and recognition of their union. At a conference called by Governor Herring following the shutdown of the plant the settlement was reached which brought electric power flooding back into the network of Des Moines and near-by cities at 6:18 a.m.

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Tariff Advantages Granted United States by Cuba

Signing of the reciprocal trade agreement with Cuba, which went into effect this month, is not without interest to the electrical industry in the United States. In return for concessions for agricultural products, which comprise well over 90 per cent of the island's exports to the United States, Cuba has granted this country increased tariff advantages on most of those commodities which concern our exporters to Cuba.

The changes fall into two classes. One is a reduction in the rate of import duty, the other is an increase in the percentage of preference with respect to the lowest rate of duty granted to like products imported from any third country.

Reductions in the permissible rates of duty imposed are generally small, but the percentages of preference have in many instances been materially increased. On incandescent lamps, for example, the latter was formerly 25 per cent, but has now been raised to 60 per cent for small and 50 per cent for large bulbs. On motors and on portable or fixed machinery, which presumably covers electrical equipment, it was changed from 20 and 25 per cent to 30 per cent, on radio sets from 30 per cent to 35 per cent, on motion picture apparatus from 20 per cent to 50 per cent.

After rising to nearly $300,000,000 in 1925, Cuba's total imports fell to one-sixth of that amount in 1932. Imports from the United States declined for the same years from $187,000,000 to $28,000,000. Improvements in her economic condition, therefore, carry possibilities for restoration of commerce that run into respectable figures.

Agreement Hopeful on Steam Properties

Discrepancies in various steam tables handicapping utilization of higher temperatures and pressures being ironed out by international conference

A colorful banquet, composed of scientific celebrities from Great Britain, Germany, Czechoslovakia, Sweden and Switzerland, as well as the United States, including about 200 men and ladies, served as a social interlude to the technical sessions of the Third International Steam-Table Conference held in this country September 17 to 22 inclusive. The banquet, held at the Astor Hotel, New York, on September 19, was preceded by business sessions at the Bureau of Standards, Washington, D. C., and at Massachusetts Institute of Technology, Cambridge, Mass. Subsequent meetings were held at the Engineering Societies Building, New York City.

Alex Dow presides

Alex Dow, president of Detroit Edison Company and past-president of the A.S.M.E., was presiding officer, while Harvey N. Davis, president of Stevens Institute of Technology, was toastmaster.

Among the speakers were Col. Paul Doty, president A.S.M.E.; Henry L. Guy, chief of British delegation; Prof. Frederick G. H. Henning, chief of German delegation; L. V. Robinson, representing Czechoslovakia; Arthur M. Greene, Jr., dean Princeton engineering college, and Dexter S. Kimball, dean of engineering Cornell University.

Scientifically, the conference is the third of a series started in 1929, when it was found that simultaneous research in the United States, Great Britain and Germany, on elements that affect the steam properties in the higher-pressure superheat range, lacked agreement and caused discrepancies. At the first international conference, to harmonize values, agreement was reached on a skeleton table and establishment of tolerances subject to revisions. At the second conference, in 1930, further tolerances were established. As a result of the current conference, it is hoped that these tolerances will be reduced to about one part in 3,000 or 4,000. The values most affected are in the superheat and critical regions which influence the utilization of higher temperatures and pressures of steam.

Three Code Theories Offered in Portland

Northwestern section of Electrical Inspectors Association discusses possible redrafts of National Electrical Code — J. F. Julian new president

Three distinctively different theories for revising the National Electrical Code, one from the utilities, one from Portland and one from Seattle, were offered for the consideration of the Northwestern section, International Association of Electrical Inspectors, at the eighth annual convention of that organization held at the Multnomah Hotel in Portland, Ore., September 17-19. These redrafts were discussed without formal action being taken.

The Utilities Proposed National Electrical Code Rearrangement (ELECTRICAL WORLD, September 15, page 39), was presented by Victor H. Tousley, secretary of the International Association. This code, which enunciates basic safety principles segregating these from regulations for fabrication practice, was not discussed because of the fact that it has been so recently released no one had had an opportunity to examine it. The method by which Portland seeks to make the code more suitable for local use by additions to and subtractions from it was presented by L. W. Going, chief electrical inspector of that city. This plan is embodied in an ordinance which is to be proposed before the City Council and is made effective by adopting the N.E.C. as amended by a supplement containing the additions and subtractions.

A totally different idea, being developed in Seattle, was offered for consideration by H. A. Patton, Washington Surveying & Rating Bureau of that city, and M. P. Hotelling, electrical inspector. This plan contemplates an editing of the code in which its language will be made more definite in an attempt to make its provisions unquestionably enforceable before a court of law.

At the closing session J. F. Julian, electrical inspector of Wenatchee, Wash., was elected president. Other officers elected were: M. P. Hotelling, Seattle inspection department, and E. G. S. Pryor, Underwriters' Laboratories, Seattle, vice-presidents; F. D. Weber, Oregon Insurance Rating Bureau of Portland, secretary and treasurer.

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Durable Goods Industries Form Permanent Committee

Formation of a new Durable Goods Industries Committee as a permanent organization was announced last week by George H. Houston, chairman of the committee and president of the Baldwin Locomotive Works.

In explaining the creation of the new committee as an outgrowth of the temporary committee formed last March at the request of General Hugh S. Johnson, Recovery Administrator, Mr. Houston said: "Re-employment in the durable goods industries is still the keystone of recovery. The Durable Goods Industries Committee will continue to analyze the conditions interfering with such re-employment, including governmental regulation of industry and the supply of capital to private business upon which these industries must rely for support; also proposed plans for industrial reform and social changes of such a character as to discourage new enterprise."

Mr. Houston stated that the committee will continue to crystallize the viewpoint of industry with respect to recovery.

Serving with Mr. Houston will be James W. Hook of the Geometrical Tool Company as vice-chairman and Harry S. Kimball of the Fabricated Metal Products Industry as treasurer. Other members are: C. R. Messinger, Oliver Farm Equipment, Chicago; S. V. Voorhees, Voorhees, Guillin & Walker, New York; R. W. Irwin, Robert W. Irwin Company, Grand Rapids, Mich.; George P. Torrence, Link Belt Company, Chicago; Franklin R. Hoadley, Farrel-Birmingham Company, Ansonia, Conn.; Lewis H. Brown, Johns-Manville Corporation, New York; C. C. Sheppard, Louisiana Central Lumber Company, Clarks, La.; H. Gerrish Smith, National Council of American Shipbuilders, New York, and Walter J. Kohler, Kohler Company, Kohler, Wis.

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Caballo Project Denied Federal Allotment

Declaring that the market for electric power in the El Paso area is problematical and that the entire output of the proposed hydro-electric plant at site of the Caballo Dam on the Rio Grande, a short distance below the Elephant Butte Dam, could not be utilized for several years, the application for a federal allotment of $1,000,000 for the construction of the plant has been denied by Secretary Harold L. Ickes. The proposal for constructing the hydro-electric plant has been before the Public Works Administration for several months. It was opposed by existing private electric power companies in the Southwest.

HARNESSING A MIGHTY RIVER

Wide World

Upstream face of the Boulder Dam project and the work of construction to date. Directly in the foreground the upper cofferdam is visible, while on both sides, back of the dam, are shown the huge intake towers that have been designed to utilize the tremendous water of the Colorado River that will be generated at the dam.

New Motor Practices Discussed at Iron and Steel Convention

Latest trends manifested in reports submitted to Association of Iron and Steel Electrical Engineers — Republic Steel executive lauds employee representation plan of collective bargaining

Water and forced-air cooling of motors is an increasing practice in the steel industry, members of the Association of Iron and Steel Electrical Engineers, meeting in Cleveland September 17 to 19, were told. Several recent mill buildings were reported to have been built with air ducts in the columns to supply motors with coolant air. Water, however, with about 1/3,500 as much volume to move, is offering even more attractive possibilities where ambient temperatures are high and duty cycles severe. Regulation motors are now being built with fins and ribs to facilitate cooling whenever a water jacket may be added later because of increased duty on the motor.

One producer is supplying jackets with top and bottom covers to make possible normal inclosed operation when both covers are off for air circulation, forced water cooling when both covers are on and spray cooling with top cover off and a drain in the bottom one. All this indicates a trend, deplored by some of the steel engineers, away from emphasis on the N.E.M.A. standard motors.

Another trend manifested by the discussion was the disposition to abandon the use of elaborate automatic regulation of the relative speeds of successive stands in rolling mills. Manual operation with vernier rheostats and practically standard motor characteristics seems to function without too much looping of the strip. But on the other hand there is much more thought than formerly being given to precise control of speeds, acceleration and braking of the run-out tables and coilers in continuous strip mills. In general, these controls are utilizing an assembly of available control devices rather than resorting to wholly new designs.

Development of the billet gouging and chipping machines has largely solved one of the steel industry's acute problems, that of removing flaws from billets.

In spite of the current slump in the steel industry the convention was unusually well attended. There were more than a thousand present at the session at which Tom M. Girdler, president of Republic Steel, extolled the benefits of the employee representation plan of collective bargaining as contrasted with what organized labor is agitating under 7a of the NRA act. He viewed with apprehension the immediate outlook for business now adversely affected by the administration's labor policy of tacit encouragement of the labor organizations.

New officers for the year 1934-35 include W. H. Burr, Lukens Steel Company, president; J. A. Clauss, Great Lakes Steel Corporation, and G. R. Carroll, Jones & Laughlin Steel Corporation, vice-presidents; W. S. Hall, Illinois Steel Company, treasurer, and A. D. Adams, Spang Chalfant Company, secretary.

COMING MEETINGS

Illuminating Engineering Society—Annual convention, Baltimore, Md., October 1-4. D. W. Atwater, Secretary, 29 West 39th St., New York.

American Welding Society—Fall meeting, Hotel New Yorker, New York, October 1-5. M. M. Kelly, Secretary, 29 West 39th St., New York.

National Safety Congress—Public Utilities Section, Cleveland, Ohio, October 2-4. John J. Barada, Laclede Gas Light Company, St. Louis, Mo.

Empire State Gas and Electric Association — Annual meeting, Westchester Country Club, Rye, N. Y., October 5-6. C. H. B. Chapin, Grand Central Terminal, New York City.

National Electrical Wholesalers Association — Hotel Book-Cadillac Detroit, Mich., October 15-17. E. Donald Tolles, 165 Broadway, New York.

National Electrical Manufacturers Association — Annual Meeting, Chicago, October 17-20. W. J. Donald, 155 East 44th St., New York.

National Association of Railroad and Utilities Commissioners — Annual meeting, Washington, D. C., November 12-15. James B. Walker, 270 Madison Avenue, New York.

$1,000,000 Pay Increase for Edison Employees

Reclassification of workers by the New York Edison Company and affiliated United Electric Light & Power Company now being made will cost the companies approximately $1,000,000 a year in increased wages, Frank W. Smith, president of New York Edison, announced this week. Local 100 of the Brotherhood of Utility Employees had charged that by reclassification the companies were shifting employees to lower brackets at lower pay and consolidating offices to effect economies.

"This classification which Local 100 is criticising," Mr. Smith said, "is an endeavor to make jobs and salaries more accurately commensurate than they have been in the Edison and United companies. . . . There has been no effort in the reclassification to put people into grades which would create lower salaries. . . . It is true that Edison and United district offices within the company are being combined, but this is not letting people out of their jobs, or making for economy at the expense of the workers. It is simply done to improve the service of two companies operating in the same territory."

Two Open Sessions Planned for N.E.M.A. Convention

Two open sessions will be held by the policies division of the National Electrical Manufacturers Association at the annual meeting to be held in Chicago October 17-20. At the first open meeting, scheduled for October 17, Virgil Jordan, president National Industrial Conference Board, will make an address on a subject of timely interest to the industry in connection with current affairs.

John A. Stevenson, head of the John A. Stevenson Agency of the Penn Mutual Life Insurance Company of New York and Philadelphia, and president of the Marketing Executives' Society, will speak on the subject "Training the Sales Force to Observe a Code." "The NRA Code and Problems Thereunder" will be the subject of an address by Francis E. Neagle. At this second meeting the James H. McGraw award will be presented.

EVENTS IN WASHINGTON

Everything in the way of co-operation that could be desired has been forthcoming from central-station companies in making returns on the power and light survey, Basil Manly, member of the Federal Power Commission, declares. Work of tabulating and analyzing the returns already has begun. Results, however, will not be made public piecemeal. Field work on the power survey is practically complete. Nearly all of the field men have returned to Washington and are busy making their reports and correlating their data.

Extended testimony has been taken by the Federal Power Commission to determine the reasonableness of engineering fees in connection with the project of the Lexington Water Power Company on the Saluda River in South Carolina. Engineers for the licensee have dealt in detail with the additional costs arising from the slide in the hydraulic fill dam.

PAUL WOOTON,
Washington Correspondent.

Modern Design Marks New York Exposition

Styling is transforming many home appliances and with color will make selling easier — McCarter opens show

More than 150 exhibits of electrical appliances and radio were featured in the annual National Electrical and Radio Exposition at Madison Square Garden, New York, for ten days ending today. The strongest impression in the show was the progress made in the past year in the styling of electrical appliances.

Clothes washers have taken on new dignity and look like furniture and not just mechanical equipment. Refrigerators, ranges, ironers have improved designs that should prove far more appealing to the customer and make selling easier. Cleaners, flatirons, grills, toasters, waffle irons have a new richness of finish and appointment that make them more desirable as gifts and for household use. Glass coffee maker sets are growing in variety and popularity.

Refrigeration has sprung some surprises. Norge and Grunow models are finished in color, departing from the exclusive white of the past. A new May refrigerator made its appearance with a small door mounted in the main door. This small door gives access to a shallow compartment for the milk, butter, beer and other supplies in frequent use, and to the ice cube trays. It keeps the interior closed so that no cold is lost when the small door opens. The Thor clothes washer that mounts an ironer or a mixer unit on the wringer shaft was a novelty.

The show opened with a big industry luncheon addressed by Thomas N. McCarter, president of the Edison Electric Institute.

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Range Sales Far Above 1933

Sales of electric ranges during the three summer months of 1934 more than doubled those in 1933, according to figures announced by the National Electrical Manufacturers Association. Exact comparisons cannot be made because of changes in the number of reporting companies, but it seems clear that aside from its much greater magnitude the volume held up somewhat better as the season wore on than it did a year ago. During August 11,333 units were sold and during the first eight months of the current year 87,025.

Except as indicated the following figures on billed sales are based on the reports of eleven companies:

	1934		1933	
Month	Units	Value	Units	Value
June	13,620	$960,422	5,460*	$427,913*
July	11,637	781,453	4,655	397,154
August	11,333	766,042	4,422†	339,453†

*Nine companies. †Ten companies.

ICE FROM TROPICAL OCEAN POWER

Underwood & Underwood

The floating ice factory, *Tunisie*, which is to utilize the energy in ocean water to drive refrigerating machinery off Brazil in accordance with the plans of Georges Claude, inventor. Warm surface water (about 75 deg. F.) is pumped into a fireless "boiler." There a vacuum is maintained by water at about 60 deg. F., pumped from a depth of over 2,000 ft. The surface water boils in consequence. The steam generated drives turbines, which in turn cause refrigerating machinery to freeze ice at the rate of 1,000 tons a day. The ice is to be used primarily for air conditioning. Here is a view of the ship just before she sailed from Dunkirk, France

Lighting Stressed at Western Meeting

Electrical Association holds remarkable meeting — Sales dominate — Better Light-Better Sight campaign pushed

A convention conducted by study and reading lamp illumination exclusively—the first of its kind on record! Such is the distinction that belongs to the Rocky Mountain Electrical Association, which met in annual session at Estes Park, Colorado, September 10-13. The largest and most spectacular garden-lighting scene ever produced anywhere, with lofty pines and an array of mountain peaks 13,500 ft. in height as a background and a near-by glacier providing the running water effects, also was viewed during the gathering, where light and lighting equipment formed a major part of the discussion program.

A post-convention session of a majority of the managers in the area was held in Denver, to dispose of business which could not be taken up within the prescribed convention time limits. The meeting was held in the recently completed Electric Institute of the Public Service Company of Colorado. The institute, first of its kind in this region, was dedicated by Guy W. Faller, vice-president and general manager of the company, to the Better Light-Better Sight movement and the promotion of all things electrical.

While merchandising was the dominant theme of the Estes Park convention, scores of other subjects were exhaustively discussed and plans for action laid. E. E. Brazier, General Electric Supply Corporation, Denver, chairman of the Appliance Division, received the association's annual award for notable achievement during the past year.

G. B. Buck, Public Service Company of Colorado, was re-elected president. Other officers elected include: T. C. Brown, Socorro, N. M.; K. W. Kissick, Trinidad, Col.; J. H. Jacobucci, Green River, Wyo., vice-presidents; A. C. Cornell, Denver, treasurer. George E. Lewis, Denver, was re-elected as secretary and managing director.

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Maryland Plants Sold

Following public hearings, the Maryland Public Service Commission has authorized the Piedmont Electric Light & Power Company and the Keyser Light & Power Company to transfer all property in Maryland to the Potomac Edison Company. The commission also permitted these companies to discontinue their rights and privileges under franchises in Maryland. In making the applications each of the companies was joined by the Potomac Edison Company.

Columbia Basin Commission Plans Power Survey

To impress upon President Roosevelt the necessity for the construction of the high dam on the Coulee project without delay, the Columbia Basin Commission, meeting in Seattle recently, made plans for a survey of the market for cheap power in the State of Washington. The action was taken on the promise of the President in his Coulee Dam speech that the high dam will be authorized when he is shown that power generated in the low dam, under construction, can be consumed. The Washington survey will be linked up with similar work being carried on in Oregon, Idaho and Montana. Decision to add the high dam to the Coulee project would increase the government outlay, it was stated, from $63,000,000—the estimated cost of the low dam and power plant—to $175,000,000.

Reclamation Bureau signs contract

Contract for the low dam and power plant, awarded recently to the Silas-Mason Company of New York, the Walsh Construction Company of Davenport, Iowa, and the Atkinson-Kier Company of San Francisco by the Department of the Interior, was signed last week in Denver by the United States Reclamation Bureau. It went on a low combination bid of $29,339,301 (ELECTRICAL WORLD, July 21, page 92).

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Diablo Contract Awarded

Contract for construction of the Diablo power house has been awarded by the Seattle Board of Public Works to the Henrikson-Alstrom Construction Company, which submitted a bid of $267,298. Work will be started at once. The contract involves construction of the power house building, construction of a combination transformer and switch platform, railroad bridge and tailrace, furnishings and placing concrete in generator pedestals, walls, beams, slabs and around machinery in the power house building.

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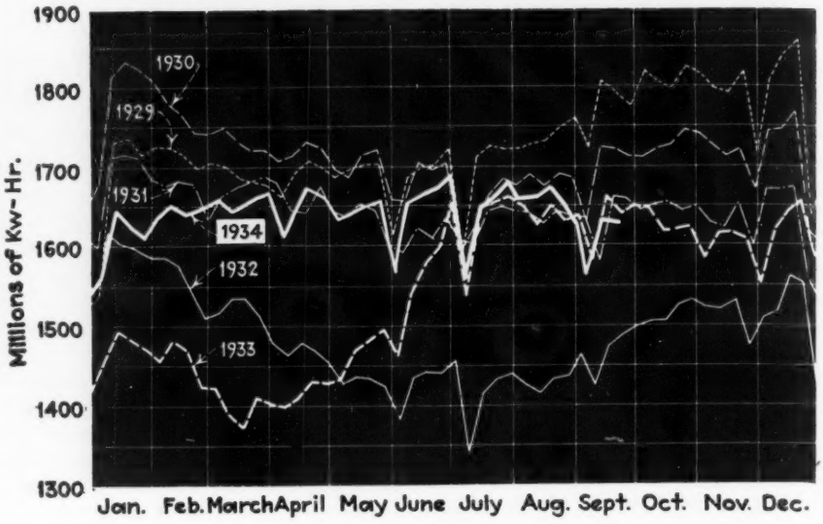
Cleveland Plant to Expand

Day load on the Cleveland municipal plant has increased 31 per cent during the past year and customers have increased from 45,000 to 49,000. Night load recently came within 2,000 kw. of the safe operating capacity (called 36,000 kw.) and Mayor Harry L. Davis has asked Utilities Director W. J. Rogers to report on plans for expansion of the plant. The latter has estimated that it would cost $1,500,000 to add 15,000 kw. of capacity to the present 50,000 installed.

Textile Strike Masks Power Use



During the past few weeks the output of electric light and power plants has been running somewhat below that of a year ago, but with indications of recovery last week. Reported by the Edison Electric Institute as 1,633,683,000 kw.-hr. for the first full week after Labor Day and 1,630,947,000 kw.-hr. for the week ended September 22, it fell short of production in the corresponding periods of 1933 by 1.8 and 0.5 per cent, respectively.

Curtailed consumption in the big textile industry, which normally uses some 200,000,000 kw.-hr. a month, probably more than accounts for the decrease. Percentages in New England and in the South are seriously off. The deficiency in the Mountain States is largely explained by an extraordinary gain a year ago. In contrast, output in the Middle Atlantic, West Central and especially the Pacific region is well above that generated a year ago.

Apparently industrial consumption in general is holding up fairly well. The next few weeks' figures, with textile mills working again, will be the test.

Weekly Output, Millions of Kw.-Hr.

1934	1933	1932
Sept. 22...1,631	Sept. 23...1,639	Sept. 24...1,491
Sept. 15...1,634	Sept. 16...1,663	Sept. 17...1,476
Sept. 8...1,565	Sept. 9...1,583	Sept. 10...1,424
Sept. 1...1,627	Sept. 2...1,637	Sept. 3...1,465
Aug. 25...1,648	Aug. 26...1,630	Aug. 27...1,436
Aug. 18...1,674	Aug. 19...1,650	Aug. 20...1,432

Per Cent Change from Previous Year

Region	Week ended Sept. 22	Sept. 15	Sept. 8
New England	— 8.8	—11.6	— 6.6
Middle Atlantic	+ 2.9	+ 0.5	+ 0.9
Central Industrial	— 1.9	— 3.9	— 3.9
West Central	+ 3.9	+ 0.6	+ 2.5
Southern States	— 6.2	— 4.4	— 1.2
Rocky Mountain	—11.8	— 8.0	— 9.2
Pacific Coast	+10.5	+ 9.2	+10.8
United States	— 0.5	— 1.8	— 1.1

New Lighting Units Installed in Lynn

A pioneer installation of mercury-vapor incandescent street lighting units has been placed in service in the vicinity of the new post office building at Lynn, Mass., to meet conditions requiring better color values in downtown illumination than the modern sodium lighting unit offers. The combination unit, which was developed by the General Electric Vapor Lamp Company, Hoboken, N. J., includes a 400-watt high-intensity mercury vapor lamp and a 200-watt incandescent in one ornamental fixture, the mounting height being about 21 ft. and the spacing between units 175 ft. The unit delivers about 17,000 lumens at an efficiency of about 30 lumens per watt.

A demonstration of the new lighting, which includes 8 units, was planned for late this week at a gathering of utility and municipal engineers in Lynn under the leadership of C. A. B. Halvorson, consulting engineer of the General Electric Company. Service at the new installation is furnished by the Lynn Gas & Electric Company.

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Pinchot's Commission Voted into Office

Governor Pinchot of Pennsylvania won his fight to remake the state Public Service Commission last week when the Senate finally agreed to accept his appointees and voted his commissioners into office for terms ranging from three to eight years. The commissioners include Chairman C. Jay Goodnough, P. S. Stahlnecker, Frederick Gruenberg, Herman J. Goldberg and Thomas C. Egan.

Lilienthal Returns from England with Data on British Grid

T.V.A. may utilize some features of British system — E.H.F.A. display headquarters opened in Chattanooga — Authority gets $15,000,000 allotment — Urges utility collections on appliance sales

Possible application of certain features of the British grid system to the power development program of the federal government may result from the visit abroad of David E. Lilienthal, who returned last week on the *Leviathan* with Llewellyn Evans, chief electrical engineer of the Tennessee Valley Authority. While Mr. Lilenthal declined to discuss his findings until he submits a report and recommendations to the T.V.A. and the National Power Policy Commission, he did say that power development both in England and Ireland is making rapid strides with per capita consumption showing a remarkabe increase. Discussing household electrical appliances Mr. Lilienthal said that the American makes are far ahead of the British. He said that one of the most encouraging signs there in use of electricity was the installation of electric ranges and other heavy use appliances in most of the new housing projects.

E.H.F.A. opens display headquarters

The Electric Home and Farm Authority opened its main electrical appliance display in the James Building, Chattanooga, last week as a household service center with all-electric kitchen, electric laundry and auditorium fitted for public demonstrations. Air conditioning is one of the display's features. The opening program began with a banquet at which Mr. Lilienthal addressed a group including leading figures of the electrical industry, United States Congressmen and Tennessee state officials. "Consumers should be protected against inferior electric appliances through the medium of a consumers' laboratory to be operated under government auspices," Mr. Lilienthal said. "The laboratory should also conduct research looking toward the improvement of designs and new designs which will make electric appliances best adapted to the needs of the average family. The mark of approval of such an agency may well become sufficiently important that few customers will buy equipment unless approved by such an agency . . ."

The man of average income must have financing available for electricity-using appliances, according to Mr. Lilienthal, who said collections should be made by the central stations furnishing the electricity so as to eliminate duplication of collection expense. In the matter of consumer financing, Mr. Lilienthal said great progress has also been made. "Here the principles put forward by E.H.F.A. have been put into practice on a broad front by the Commonwealth & Southern companies and other privately and publicly owned utilities.

Other T.V.A. developments

An additional $15,000,000 has been allotted from Public Works funds for the Tennessee Valley Authority.

Bonds of the Tennessee Public Service Company continue to be deposited in accordance with the stipulation that 90 per cent of the holders must turn in their certificates to consummate the deal. The deadline has been advanced to September 27.

At a recent hearing before the Alabama Public Service Commission on a petition of the Alabama Power Company for approval of the sale of $1,000,000 worth of its North Alabama properties to the T.V.A., the authority took the position that states in which it operates do not have the power to regulate its utility activities. Position of the T.V.A. was set out in a letter received by the commission prior to the hearing from Mr. Lilienthal in which he stated the T.V.A. "was not at liberty to concede in any way the jurisdiction of the Alabama commission to regulate the T.V.A. in any operation within the state." Mr. Lilienthal added that the T.V.A. would be unable to participate in the hearing "in any formal manner, lest such participation might be subsequently construed as a voluntary yielding on the jurisdiction question." At the same time he expressed a desire to co-operate with the state body so long as the question of jurisdiction was not involved.

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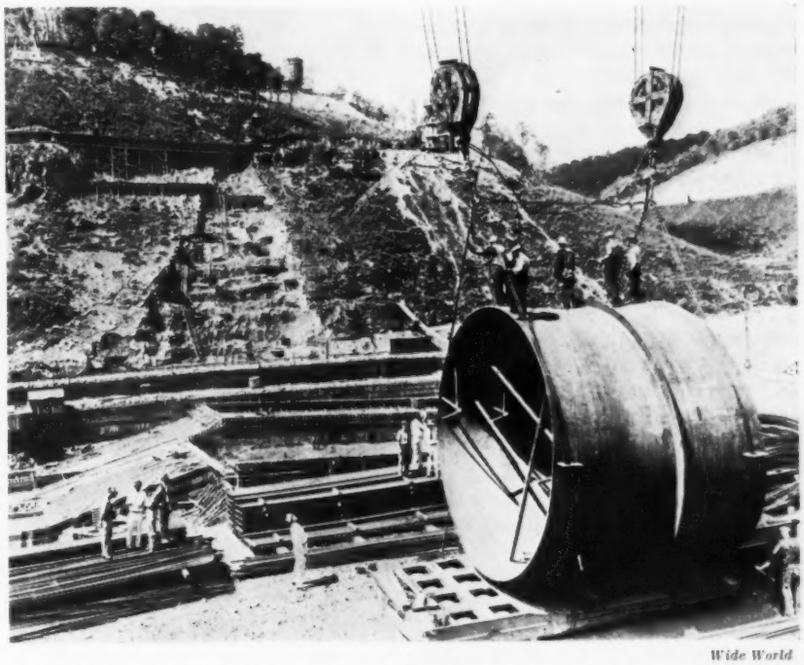
Spokane Company Opposes Public Utility District

Washington Water Power Company, Great Northern Railway Company and Northern Pacific Railway Company have filed an action in court against Carl E. Devenish, chairman of the board of Lincoln County (Wash.) commissioners; Floyd J. Underwood, prosecuting attorney, and Lloyd B. Peffley, auditor, members of the county election board, to restrain the board from further consideration of a petition for the creation of a public utility district co-extensive with the limits of Lincoln County and to have the board enjoined from placing this power district proposition on the ballot at the election, November 6.

LOWERING PENSTOCK TUBES AT NORRIS DAM



Wide World

First huge section of the two penstock tubes at the Norris Dam, T.V.A.'s $32,000,000 project near Knoxville, as it was lowered into place at the dam. Each section of these tubes is 20 ft. in diameter and each of the two tubes will be more than 300 ft. long when completed

Graybar Drops Private Brand

Turns to policy of distributing only appliances of nationally known manufacturers — Tryouts of new policy prove highly successful

Graybar Electric Company is discontinuing all its private brand merchandise. Hereafter it will sell only appliances bearing the names of nationally known manufacturers and will restrict itself to its specialized function of distributing electrical products through its 74 branch houses.

Graybar has been selling electrical supplies and equipment for 65 years, as a jobber, with a steadily growing chain of owned houses. Some 20-odd years ago, however, this company began experimenting with the development and marketing of household appliances, bearing its own brand, which was then the "Western Electric." Gradually the Graybar name has been given to a whole line of domestic appliances made by various manufacturers for private brand, under Graybar specifications. Graybar dealers have been established in every territory. But throughout the industry and trade Graybar has been known primarily as a distributor and competition with nationally advertised products of well-known manufacturers has been difficult for its dealers. The company has been more successful in selling other makes of appliances, which it has continued to distribute as a wholesaler, than those bearing its own name.

Radical departure in policy

To develop this comparison to a conclusion, Graybar has recently taken on certain outstanding products in the domestic appliance field for distribution in limited territories. In fourteen branches Graybar refrigerators have been dropped and Kelvinator is being sold. More than a dozen houses have discontinued Graybar appliances and taken on the Thor washer, manufactured by the Hurley Machine Company; Toastmaster table appliances, Royal vacuum cleaners, and Colonial radio sets. This in itself was a radical departure from past policy, because Graybar had only carried lines for which it had national distribution. These tryouts proved so successful that the decision has been made to discontinue all appliances bearing the Graybar brand with the single exception of the Graybar electric sewing machine, where no national advertised line is available for independent distribution.

Graybar's specialized distribution will now be made available to manufacturers of established products in whatever combination of territories it may be desirable to cover. Thus the local Graybar branches acquire a certain degree of individuality in that their full appliance line will be made up of the products selected for those territories. Graybar will secure the added prestige and strength of these already successful products and at the same time rid itself of the problems involved in patents, designs and manufacturing schedules. It will concentrate its entire attention on the operation of its highly specialized distributing system. Graybar advertising from now on will be devoted to promoting an appreciation of the importance of the distributing function. The Graybar tag, which will mark all the merchandise it distributes, will become in effect the symbol of a two-name guarantee by the manufacturer and the national distributor.

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Thorne and Loomis Resign from Public Service Board

Landon K. Thorne and Alfred L. Loomis, formerly at the head of Bonbright & Company, Inc., resigned as directors and members of the executive committee of the Public Service Corporation of New Jersey at the monthly meeting of the board held last week. No successors were chosen.

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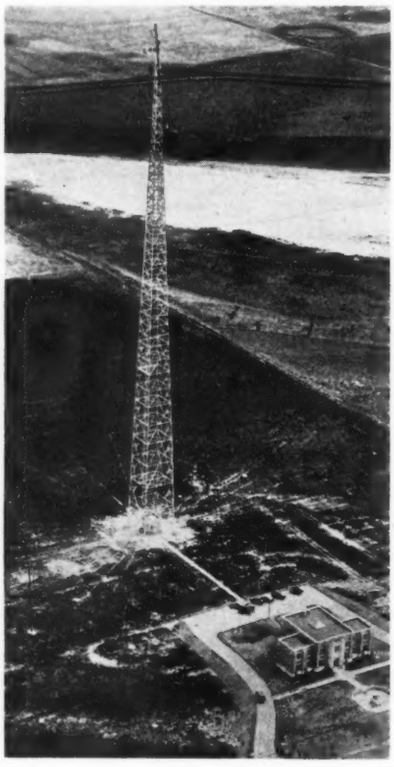
TALLEST TALKING TOWER



The highest self-supporting tower in the United States used as an aerial has been completed for the 50-kw. radio station KOA of the General Electric Company at Denver. The tower stands 470 ft. high.

American Water Works Drive Brings New Business

Electric utility companies of the American Water Works & Electric Company system have been waging a strenuous campaign to increase the use of electricity per customer with remarkable results. This is particularly true in the domestic customer list, where the average use for the entire system for the year ended July 31 was 640 kw.-hr., against 606 kw.-hr. in the preceding year.

The West Penn Power Company, the largest electric operating unit, did slightly better than the system as a whole, reporting for the year ended July 31 average domestic consumption of 686 kw.-hr., against 650 kw.-hr. a year ago.

The Potomac Edison Company added more than 2,000 new customers to its line during the first seven months this year. Recently the company launched a refrigerator sales campaign, setting a quota of 250 machines. With the drive only half over, more than 400 machines have been sold, with the prospect that the total will be more than doubled before the time limit expires. Not only is the company pushing sales of electrical household appliances to increase electric consumption, but it is going after new commercial and industrial business. Recently the O'Sullivan Rubber Company plant at Winchester, Va., changed its fifteen steam-heated rubber vulcanizing presses to electrically heated units. The change-over has increased power output more than 1,100,000 kw.-hr. annually on the basis of early operations. Other industrial plants in the territory are being encouraged to make the same switch.

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Trade Commission Probes Utility Propaganda Charge

At a hearing held last week before the Federal Trade Commission in Washington on propaganda efforts of power companies Howell Wright, director of Cleveland, Ohio, municipal utilities between 1924 and 1930, admitted that he wrote literature attacking municipal power ownership shortly after he left office.

Last week the Federal Trade Commission also heard from an examiner how the Associated General Electric Corporation, operating as a "bookkeeping unit" of the Associated Gas & Electric Company, paid dividends of $2,150,000 in 1929 from controlling the W. S. Barstow companies acquired in February of that year. "As in the case with practically all Associated System subholding companies," the examiner reported, "Associated General Electric Corporation is

nothing more than a bookkeeping unit of Associated Gas & Electric Company, having neither employees nor real organization, but simply a set of account books and supporting papers."

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Secured Creditors Present Middle West Plan

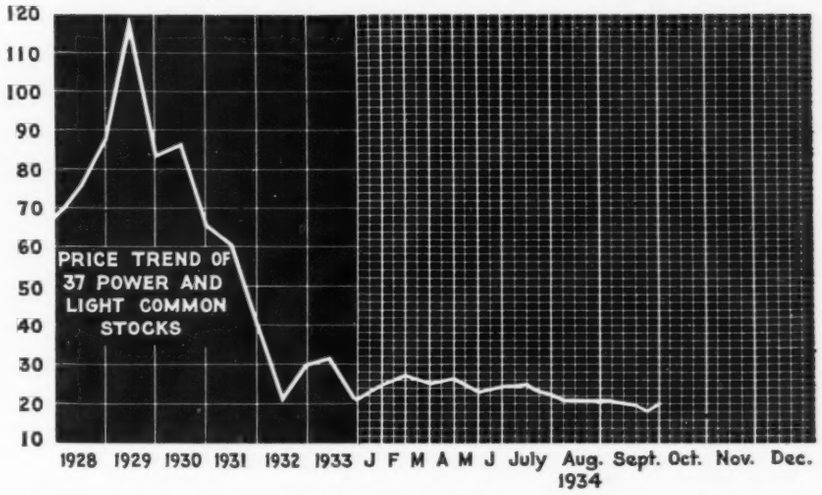
Tentative plan for the reorganization of the Middle West Utilities Company was presented to Federal Judge James H. Wilkerson this week in Chicago by Herbert A. Friedlich, counsel for secured creditors. The plan, approximately the same as that hitherto bitterly opposed by attorneys representing common stock interests, calls for the formation of a company with 3,000,000 shares of no-par common, of which 63 per cent is to be issued to secured creditors and 37 per cent to unsecured creditors, principally holders of debentures. In addition 1,243,031 shares of stock are to be authorized for sale to stockholders.

Holders of preferred stock would be given warrants entitling them to purchase one share of new stock for each share of preferred stock over a period of the next decade at prices ranging from $8 to $10 a share, with holders of common given a similar warrant for each twenty-five shares of common held. The plan definitely contemplates the issuance to unsecured creditors of one share of stock for each $40 of claims, or twenty-five shares for each $1,000 of debentures. Should this and other provisions result in the issuance of a total of more than 3,050,000 shares of new stock, the warrant prices are to be reduced 25 cents a share for each 100,000 additional shares issued.

The plan has been approved by the secured creditors and by the debenture holders' committee in principle. The preferred-stock holders' committee was given the plan with a recommendation for its acceptance by counsel for the group. Petitions filed by Orville J. Taylor, counsel for a common stock committee, and Samuel Ettelson, representing a certain group of common-stock holders, objecting to the plan, were taken under advisement and will be ruled on later.

Five associates of Samuel Insull, who petitioned the federal court for separate trials, were denied that right this week when they were ordered to go on trial next week with Mr. Insull and eleven others on charges that they defrauded the public in connection with the sale of Insull securities.

Utility Stocks Advance Slightly



Electric light and power stocks recovered this week some of the ground recently lost. Price gains were sufficient to carry the *Electrical World* index up to 20.1, compared with 19.4 last week.

APATHY

The cohorts of business are demanding that the administration end uncertainty. Resolutions, results of surveys, interviews and published statements reflect this demand. But no one tells the administration how to end uncertainty. Meanwhile, business fails to make a positive fall up-turn. Business men are either apathetic or busy in forming platforms to defeat government interference. Wall Street is pessimistic and the banks even shy at long-term government bonds. Undoubtedly the President will speak to the nation very shortly.

Retail trade and freight movements are increasing, but aside from government projects little encouraging news comes from the durable goods group. In general, business has been slackening off since May and continues in this direction despite government priming —the well is dry. Power consumption figures are distorted by the textile strike and will not return to normal for some time. Utility load is holding well and fall sales campaigns in the domestic market are bringing good results. Steel production up slightly, security markets in the doldrums, bank deposits and loans drop, commodity and other prices hold level.

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A.S.T.M. Committees Plan Insulating Studies

Construction of apparatus to determine the impregnation, bonding strength and dielectric strength of varnish as impregnation of cotton fabrics will be one of the major activities of A.S.T.M. Committee D-9 on electrical insulating materials. A subcommittee will also be active in perfecting a more sensitive test for moisture in insulating oils than is afforded by the dielectric test. Test cells are under development for measurement of oil power factors. A method will be devised for measuring power factor of mica and slate. Another activity will be the comparison of the electrometric and calorimetric methods of ascertaining acidity in insulating papers.

Committee D-11 on rubber products will continue work on the development of non-destructive tests of materials designed to protect persons from electric shock. It will also proceed with the preparation of methods of testing accelerated age deterioration of rubber insulation.

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Construction Contracts Total $120,244,500

Construction contracts placed during August were slightly higher than those reported for July and 13 per cent greater than the total shown for August, 1933, according to F. W. Dodge Corporation. Out of the August, 1934, volume of $120,244,500 a total of $51,046,800 was reported for non-residential building types; $41,905,900 for public works, $18,641,000 for residential buildings and $8,650,800 for public utilities. The August totals for non-residential building and public works classifications were larger than in August, 1933, while for residential building and public utilities the respective totals were smaller than a year ago.

New York Metal Prices

	Sept. 11, 1934 Cents per Pound	Sept. 25, 1934 Cents per Pound
Copper, electrolytic	9.00*	9.00*
Lead, Am. S. & R. Price	3.70	3.60
Antimony	8.625	8.87
Nickel ingot	35.00	35.00
Zinc, spot	4.50	4.35
Tin, Straits	51.375	51.50
Aluminum, 99 per cent	23.30	23.30

*Blue Eagle.

CO_2 Blanket Prevents Oil Sludging

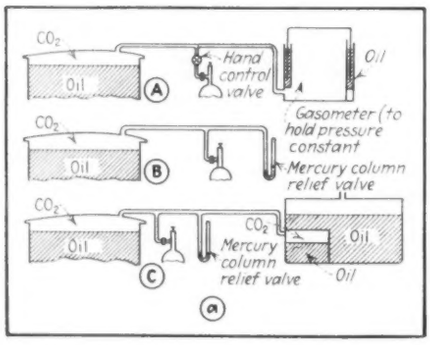
By ELLIS F. BRACKEN
Superintendent of Substation Maintenance, Commonwealth Edison Company, Chicago

Use of nitrogen in the space above the oil in transformers has given satisfactory results in operation, in that sludging was practically eliminated, but it was open to the serious objection that the deoxidizing agent was rather expensive to maintain, and attempts were made by the Commonwealth Edison Company to find a cheaper method.

It was believed that carbon dioxide gas (CO_2) possessed chemical inertness practically equal to nitrogen, quite satisfactory for this purpose, and because it could be secured at high pressure in steel cylinders and admitted to the transformer case under definite control at very moderate price its use was decided upon. It has been in use now in a limited amount for about 8½ years and has given excellent satisfaction. The development has passed through two stages into the third, which is a modified form of the first system.

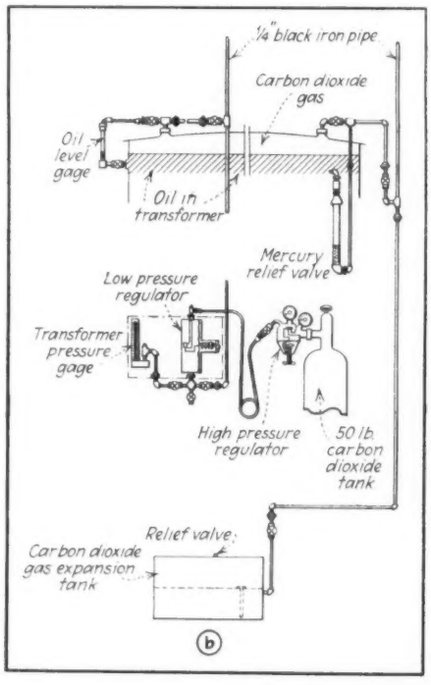
The earliest form of the equipment (A in the accompanying illustration) was rather cumbersome. This system gave excellent results, but required rather large volume for the gasometer tank. From studies of the transformer operation it appeared that the cyclic variation of volume in certain units permitted the use of a gas control system, which allowed some of the gas to escape when the pressure rose too high and admitted fresh gas when the pressure dropped. With this idea in mind, the pressure venting system (B in the figure) was devised. The gas cylinder with suitable reducing pressure valves was connected directly to the transformer case and a relief valve discharged into the atmosphere. When conditions returned to normal the automatic pressure valve would admit new gas from the cylinders. So far as the operation is concerned, this was quite successful. The amount of carbon dioxide loss by venting was not excessive, but in an effort to save it a third system was developed and is now in process of introduction on the Commonwealth Edison Company system.

The third system (C in the figure) conserves the gas by means of a divided tank, the gas driven out of the transformer space by increase of pressure passing into one chamber of the expansion tank and forcing the oil in the other chamber to a higher level. This scheme is applied to a number of transformers, all operating on one gas-controlling system.

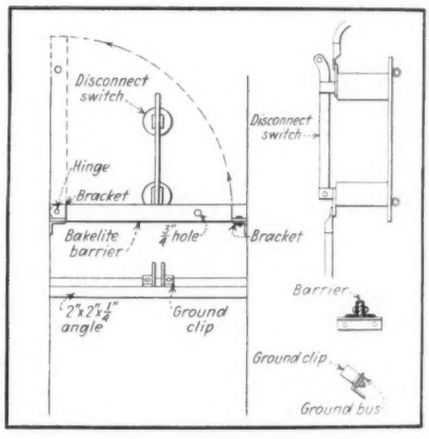


Carbon dioxide to prevent transformer oil sludging

(a) The simplified diagrams show three stages in the development of means to apply CO_2 above transformer oil. (b) The larger diagram shows how the third form is applied to two or more transformers. Valves and unions are so arranged that a transformer can be removed without disturbing the pipe to other transformers.



Hinged Bar Protects Grounding Switches



Protective bar forces operator to stop and think

Grounding by means of disconnecting switches is a common safety practice in utility substations. A very practical way to accomplish this, which includes protection against wrong opening or closing of the switch, is in use on the system of the Public Service Company of Northern Illinois.

As shown in the accompanying sketch, the ground clip is mounted on a length of angle iron extending across the switch compartment. To prevent the grounding of a live blade a bakelite bar runs across the compartment in front of the switch and above the ground clip. The bar is hinged at one end and the other end rests on a bracket fastened to the opposite wall. The free end is drilled with a ¾-in. hole.

When it is desired to ground the line after it is positively identified as dead, the barrier is lifted with the switch hook, the blade closed into the ground clip and the barrier moved

I-20 METERING ASSURES FLEXIBILITY

to Meet Every Installation Requirement Economically

THIS IS THE I-20A METER
—a standard meter unit with many new and improved features, such as a weatherproof die-cast base and a strong, corrosion-resisting sealing arrangement. Pull box and cover (not shown) permit conduit or tamper-proof-cable wiring.

THIS IS THE I-20B METER
—identical with Type I-20A except that all the necessary facilities for disconnecting, reconnecting, and testing are included under the terminal cover. Pull box and cover (not shown) permit conduit or tamper-proof-cable wiring.

THIS IS THE I-20C METER
—a completely armored, fully protected meter unit. It is identical with I-20B except for the connection block and protector case. Ideal for indoor or outdoor installation, with conduit or tamper-proof-cable wiring.

THIS IS THE I-20S METER
—a socket or plug-in type for indoor or outdoor installation, with conduit or tamper-proof-cable wiring.

The I-20 Metering provides the greatest flexibility with respect to safety features, test facilities, and protection against current diversion. It simplifies the replacement of older types of meters, because it offers the choice of replacing the meter only, or of including with the meter the accessories needed for safety and protection. Therefore, no matter what the installation requirements for a given locality may be, they can be met completely with one type of meter — the I-20.

ACCURACY

to Meet Every Variation in Load, Temperature, Voltage, Frequency, Wave Form, and Power-factor

A very significant feature of the I-20 meter is its long-range accuracy. Even at 300-per-cent load, the departure from 100-per-cent registration is almost negligible. This remarkable result has been attained without any sacrifice of torque. Therein is your assurance that light loads will also be recorded faithfully through years of service. Moreover, high torque has not been sacrificed to obtain accuracy under variable service conditions such as voltage, frequency, wave form, and power-factor. Temperature errors are minimized by a temperature-compensated magnet. Ask your G-E representative, or address General Electric, Dept. 6H-201, Schenectady, New York.

400-4

GENERAL ELECTRIC

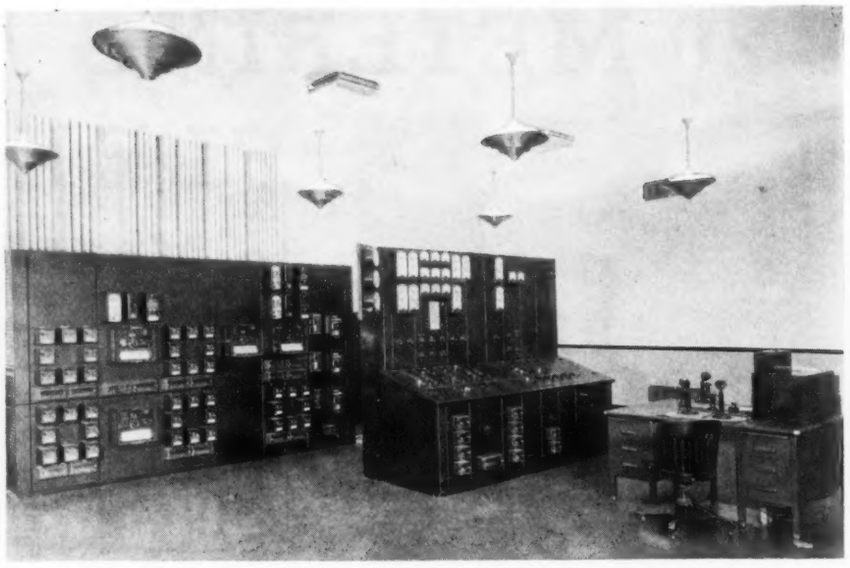
down to the horizontal position. The operation must be repeated when the switch is closed. The presence of the barrier and the necessity to raise it force the operator to think before he acts and thus help largely to prevent wrong grounding or closing of the switch.

Standard Chart for Grounding

Good grounds are as important to an electric system as street drain boxes to a sewer system. If the drains are closed the town will flood, and if the grounds are defective on an electric system every trouble will be magnified manyfold. There are probably as many opinions on grounding as there are electrical engineers and electricians combined. It is therefore important for each system to have standard instructions for grounding.

The accompanying chart of the Detroit Edison Company is very convenient. For indoor grounds concealed in walls, floors or earth two $\frac{1}{16}$-in. x $1\frac{1}{2}$-in. flat coppers are used, riveted and soldered together at 2-ft. centers. Exposed grounds indoors consist of $\frac{1}{4}$x1-in. flat copper. Three-conductor lead cables are grounded by installing ground copper to lead sheath directly below pothead. Two $\frac{1}{2}$-in. bolts with lockwashers are used for attaching ground copper to apparatus. No. 8 wire is the smallest used for instrument grounds. The secondaries of instrument transformers are grounded at the transformer and not at the switchboard.

All ground taps brought out of concrete mats outdoors are not less than No. 2/0 copper. Grounds to mats are not less than $\frac{1}{16}$x$1\frac{1}{2}$-in. copper.



Station operator has uniform lighting of high intensity

Control Room Lighted to 4.5 Watts per Sq.Ft.

To light the control room at the new Buzzard Point generating plant of the Potomac Electric Power Company, Washington, D. C., the Stone & Webster Engineering Corporation laid out twelve 500-watt Holophane indirect units, as illustrated, symmetrical spacing being employed, and the intensity provided 20 ft.-candles on the operator's desk at the right. The room is 13 ft. high with the ceiling finished just off white and the walls finished in light gray, with a floor covering of brown battleship linoleum. Clear lamps are used in the fixtures. The lighting units are spaced 10 ft. $4\frac{1}{2}$ in. x 11 ft. apart, and are mounted not to interfere with the ventilating outlets shown in the ceiling, these being arranged to deliver outdoor air during summer and warm air in winter. To furnish additional summer ventilation a floor duct was provided in the construction of the building to deliver outdoor air at the operator's desk. The control room is 41 ft. long x 32 ft. wide, but may be enlarged for future expansion of the plant. This installation has been very satisfactory in operation.

SCHEME OF BONDING AND MAKING GROUND CONNECTIONS IN SUBSTATIONS

GROUPS TO BE BONDED		STATION WITHOUT EDISON NEUTRAL OR RAILWAY NEGATIVE BUS	STATION WITH EDISON NEUTRAL BUS ONLY	STATION WITH RAILWAY NEGATIVE BUS ONLY	STATION WITH BOTH EDISON NEUTRAL AND RAILWAY NEGATIVE BUSSES
STATION GROUNDS		●	●	●	●
RAILWAY NEGATIVE BUS				●	●
RAILWAY BOND CABLES				●	●
EDISON NEUTRAL BUS			●	●	●
EDISON DRAIN CABLE (THRU 1000 A SWITCH)			●	●	●
SOIL PIPE		●	●	●	●
600 - VOLT MACHINE (RAILWAY)				●	●
250 VOLT MACHINES		●	●	●	●
24000 VOLT TO 2400 VOLT LIGHTNING ARRESTERS		●	●	●	●
600 VOLT LIGHTNING ARRESTERS (RAILWAY)				●	●
24000 VOLT TO 2400 VOLT CABLE SHEATHS		●	●	●	●
600 VOLT CABLE SHEATHS (POS AND NEG. RAILWAY)				●	●
250 VOLT CABLE SHEATHS (HOUSE SERVICE)		●	●	●	●
125 VOLT CABLE SHEATHS (D.C. FEEDERS)		●	●	●	●
CONTROL, TELEPHONE, AND SIMILAR CABLES		●	●	●	●
INSTRUMENT TRANS. SECONDARY		●	●	●	●
CASINGS AND FRAMEWORK OF TRANSFORMERS, REGULATORS, SWITCHES, CURRENT TRANSFORMERS, POT. TRANSFORMERS, BLOWERS, PUMPS, METAL CONDUIT, CABINETS, PANEL BOARD SUPPORTS, AND OTHER NON-ELECTRICAL PARTS CONNECTED THERETO	24000 TO 2400 - VOLT APPARATUS	●	●	●	●
	600 - APPARATUS (RAILWAY)			●	●
	250 - VOLT AND 125 - VOLT APPARATUS	●	●	●	●

BOND VARIOUS GROUPS TOGETHER AS INDICATED BY DOTS ON INTERCONNECTING LINE IN VERTICAL COLUMN

Standard instructions for grounding in Detroit

Transformer Bank Loading Schedules

Approaching winter directs attention to the value of loading schedules for transformer banks in relation to protection against freezing water-cooling systems and maintaining efficient service under varying loads. On a representative system the engineering department has established loading tables for all main plant and substation transformers, so that the operating shifts proceed along simplified lines during wide changes in conditions.

A prominent system station, for example, is provided with 11,000 kva. in transformers set up in one 5,000-kva. and two 3,000-kva. banks, the former being air-cooled and the two latter

Are they getting
BETTER LIGHT — BETTER SIGHT?

. . . Not Unless the Voltage Is Right

ARE the lamps you helped to place in thousands of homes during the recent campaign living up to your promise of better sight? Or are they underfed — dragging out a dim, inefficient existence — producing no adequate return for you or the consumer?

With the end of daylight saving and the return to standard time, the problem of voltage regulation becomes increasingly important. More light means more load and more need for regulators.

See that your customers **get** "Better Light . . . Better Sight." Take advantage of the increased profits and improved customer relations which result from better voltage.

Why not discuss your regulation problems with the G-E representative who contacts you? He will be glad to give you his assistance. General Electric Company, Schenectady, N. Y.

THERE'S REVENUE IN REGULATORS

350-106

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water-cooled. The loading schedule was:

Kva. Load	Transformers Used
0 to 3,000	One 3,000-kva. bank
3,000 to 5,000	One 5,000-kva. bank
5,000 to 6,000	Two 3,000-kva. banks
6,000 to 9,000	One 3,000-kva. and one 5,000-kva. banks
9,000 to 11,000	All banks in the station

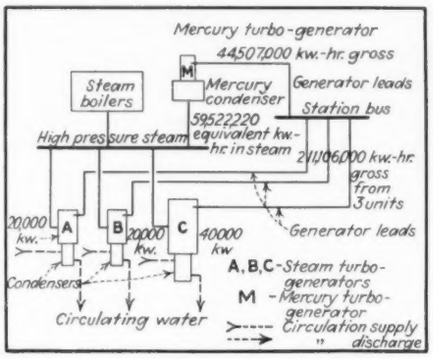
During cold weather in most cases a 3,000-kva. bank will be in service, so that it is possible by shifting transformers to keep them warm. At no time is the temperature of the two 3,000-kva. banks allowed to fall below 11 deg. C., regardless of operating economy. During zero weather it is customary to put all banks in service.

Question arose as to the necessity for notifying the load dispatcher at a central substation before and after switching transformers out of service for economy purposes. It was pointed out that after the afternoon peak one transformer bank can carry the 22-kv. load, and that as one bank begins to run hot a spare bank is put on and the hot one removed. As no large capacity was switched in or out of service, the point brought up was whether any need existed in such cases for troubling the distant dispatcher with the matter.

The answer to this question was that all changes in transformer service should be forwarded by telephone to the dispatcher in order to enable the system diagram board to be kept pegged up to the minute. It also appeared in the case discussed that the capacity connected to the station 22-kv. bus both from the 66-kv. and 13-kv. energy supplies is affected by transformer bank shifts. This is important to the load dispatcher, especially if there are any signs of storm.

Chlorination Cheap at Hartford Station

Chlorination of condenser circulating water in 1933 at the South Meadow station of the Hartford Electric Light Company proved so effective that two of the three condensers associated with steam turbo-generators were not cleaned during the year. The third condenser was cleaned three times, but only once was an appreciable amount of slime found. The chlorination plant was described in the ELECTRICAL WORLD, May 14, 1932, page 856.



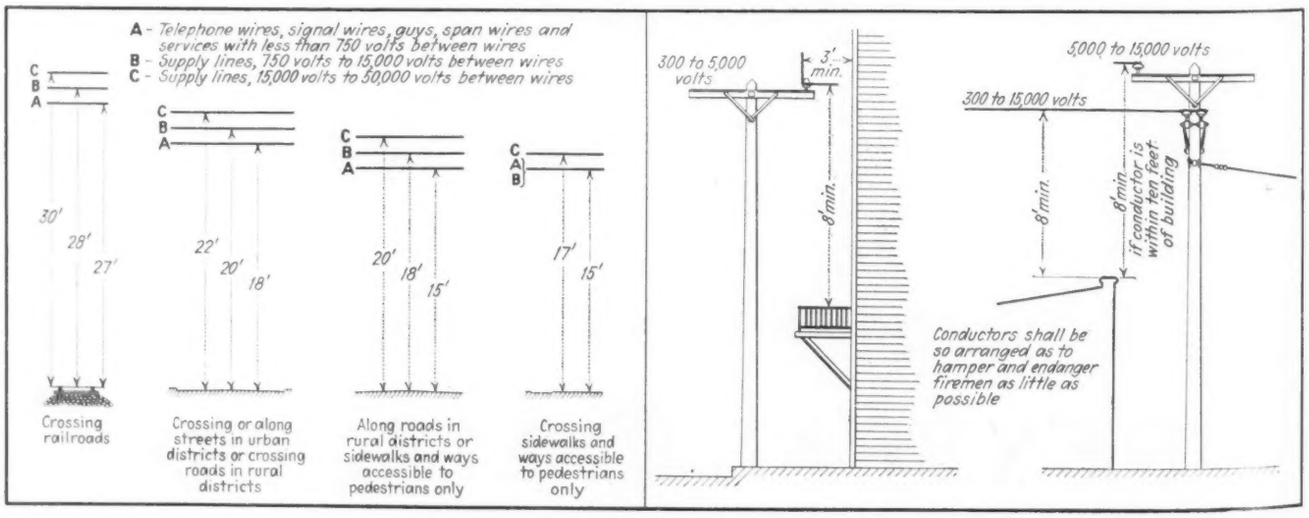
Elementary scheme of mercury and steam unit arrangment at the South Meadow Station

No evidence could be found last year of corrosion due to the use of chlorine. The plant's limestone tank was cleaned and relined at the end of the year, and as was the case previously, the asphalt lining was found to have been rubbed off by the settlement of the limestone. To prevent this the lining was covered with 1-in. boards to take the abrasion and thus extend the life of the tank. Last year the chlorination system required the use of 41,250 lb. of chlorine and 51,300 lb. of limestone, costing $1,840.

A schematic diagram of the generating unit arrangement in the station is shown. The electrical output of the station is obtained from 80,000 kw. in steam turbo-generators and from a mercury unit rated at about 20,000 kw. Steam for the turbo-generators first named is supplied from the boiler plant and from the mercury unit condenser as indicated. The total gross output of the electrical generators of the plant in 1933 was 255,613,000 kw.-hr., leaving a gross output from the steam units of 211,106,000 kw.-hr. This steam output was obtained at the foregoing low chlorination cost for materials used; in other words, about 115 kw.-hr. steam turbo-generator gross output was obtained per mill of expense for chlorine and limestone. Operating performance as well as economic results have been very satisfactory.

Minimum Distance to Ground and Building

Even though local conditions will govern the heights of conductors above ground or their distances to buildings, standards can and should be established to cover the majority of cases of a particular system. Such standards should be in very simple form, giving definite instructions for each case, as are the accompanying illustrations used by the West Penn Power Company.


A - Telephone wires, signal wires, guys, span wires and services with less than 750 volts between wires
B - Supply lines, 750 volts to 15,000 volts between wires
C - Supply lines, 15,000 volts to 50,000 volts between wires
C
B
A
30'
28'
27'
22'
20'
18'
20'
18'
15'
17'
15'
Crossing railroads
Crossing or along streets in urban districts or crossing roads in rural districts
Along roads in rural districts or sidewalks and ways accessible to pedestrians only
Crossing sidewalks and ways accessible to pedestrians only
300 to 5,000 volts
3' min.
8' min.
5,000 to 15,000 volts
300 to 15,000 volts
8' min.
8' min.
if conductor is within ten feet of building
Conductors shall be so arranged as to hamper and endanger firemen as little as possible

Standard clearances to ground are used on the West Penn System

USE THESE OUTSTANDING G-E INSULATING MATERIALS

Here are only three items of the complete line of G-E Insulating Materials. They are manufactured, approved and used by the General Electric Company in the manufacture of its products.

G-E 1676 Black Baking Varnish . . . reduces baking time . . . builds film faster . . . provides maximum resistance.

G-E 227 Cable Joint Compound . . . freedom from gassing . . . lower viscosity at pour point . . . improved flexibility at low temperatures . . . lower coefficient of expansion . . . high heat resistance . . . low loss on heating.

G-E 1786 Black Varnished Cloth Tape . . . bias cut . . . resistant to mineral oil . . . high dielectric and tensile strength.

For information on complete line of G-E Insulating Materials, write to Section MY-219, Merchandise Department, General Electric Company, Bridgeport, Conn.

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INSULATING MATERIALS

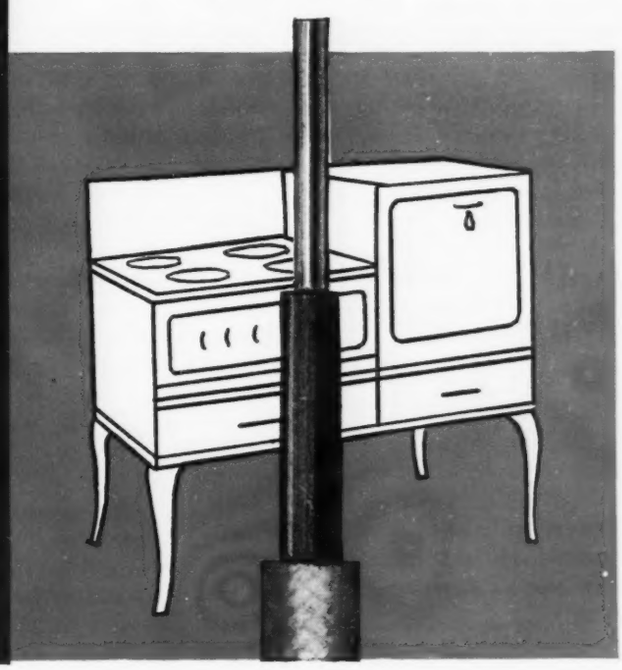
SPECIFY DELTABESTON ASBESTOS CABLE ON THE RANGES YOU BUY

Ranges increase the load . . . but not profitably unless they give long uninterrupted service. Frequent repair calls caused by failure of improperly insulated wires are costly. But they can be eliminated. Specify Deltabeston Cable in the ranges you buy. Its ageless, compact, felted-asbestos insulation is immune to heat and resistant to moisture. Also, use Deltabeston Cable in all replacement work. Its superiority has been proved.

For complete information, see your nearest G-E Merchandise Distributor or Graybar Electric Co., or write Section MY-219, Merchandise Department, General Electric Company, Bridgeport, Connecticut.

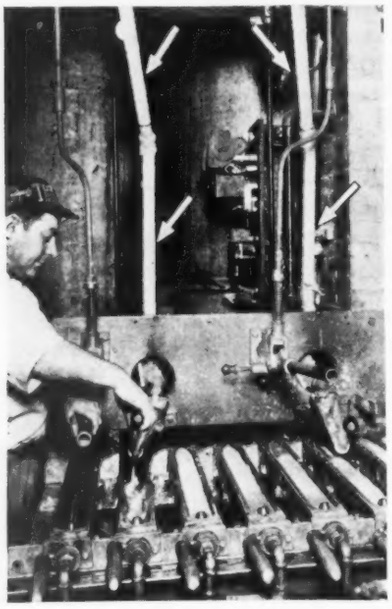
GENERAL ELECTRIC

DELTABESTON WIRE AND CABLE



Strip Heaters Stop Metal Freezing

Down through pipes from the floor above, where an 8-ton type-metal melting furnace is in operation, the molten stream flows into water-cooled molds. But somewhere on the way down during cold weather the metal was frequently solidified. At first a serious as well as an annoying problem, it was solved by clamping strip electric heating elements around the pipes, insulating them, and turning on the current.



Heaters keep type metal in a fluid state

Soil Sterilized With Electric Heat

By A. H. GREISSER*
Portland (Ore.) General Electric Company

Sterilization of soil with electric heat for controlling seed bed diseases and to kill off weed seeds offers possibilities as a competitor to the usual method of sterilization with steam. The cost of sterilizing 1 sq.ft. of soil 5 in. deep with steam is estimated at 1.1 cents (exclusive of labor), whereas the same volume of soil can be sterilized electrically by the use of 0.35 kw.-hr. (according to a report by J. C. Scott of the Puget Sound Power & Light Company). To the cost of such electric energy fixed charges must be added for the investment in metal plates, hardware, switch and wiring materials. However, the equipment for electric sterilization is far less expensive than the steam mains, valves, headers, etc., required for steam sterilization.

Small soil sterilizers utilize the resistance of the soil to the passage of current between plates or electrodes. One commercial unit is 2 ft. 4½ in. square and 15 in. deep inside and holds 7.2 cu.ft. of soil. The electrode plates of No. 14 galvanized sheet steel are placed vertically in the box and are spaced on 6-in. centers. By connecting successive plates to opposite sides of a 230-volt circuit the soil can be heated to between 180 and 211 deg. F. with from 25 to 30 kw.-hr. per cu.yd. of soil. The materials for this type sterilizer cost approximately $17.

A smaller sterilizer, operating by the electrical resistance of the soil and approximately 14 in. square and 5½ in. deep, with three electrode plates, is retailed at $7. This unit is designed for 220-240-volt service.

The "soil resistance" sterilizers are practically automatic in operation because as the soil heats to approximately 212 deg. F., and is thereby dried, the current drops to practically zero.

The operating characteristics of the electric soil sterilizers and the difficulties encountered in their operation are fully described in Report No. M-15 issued by the National Rural Electric Project.

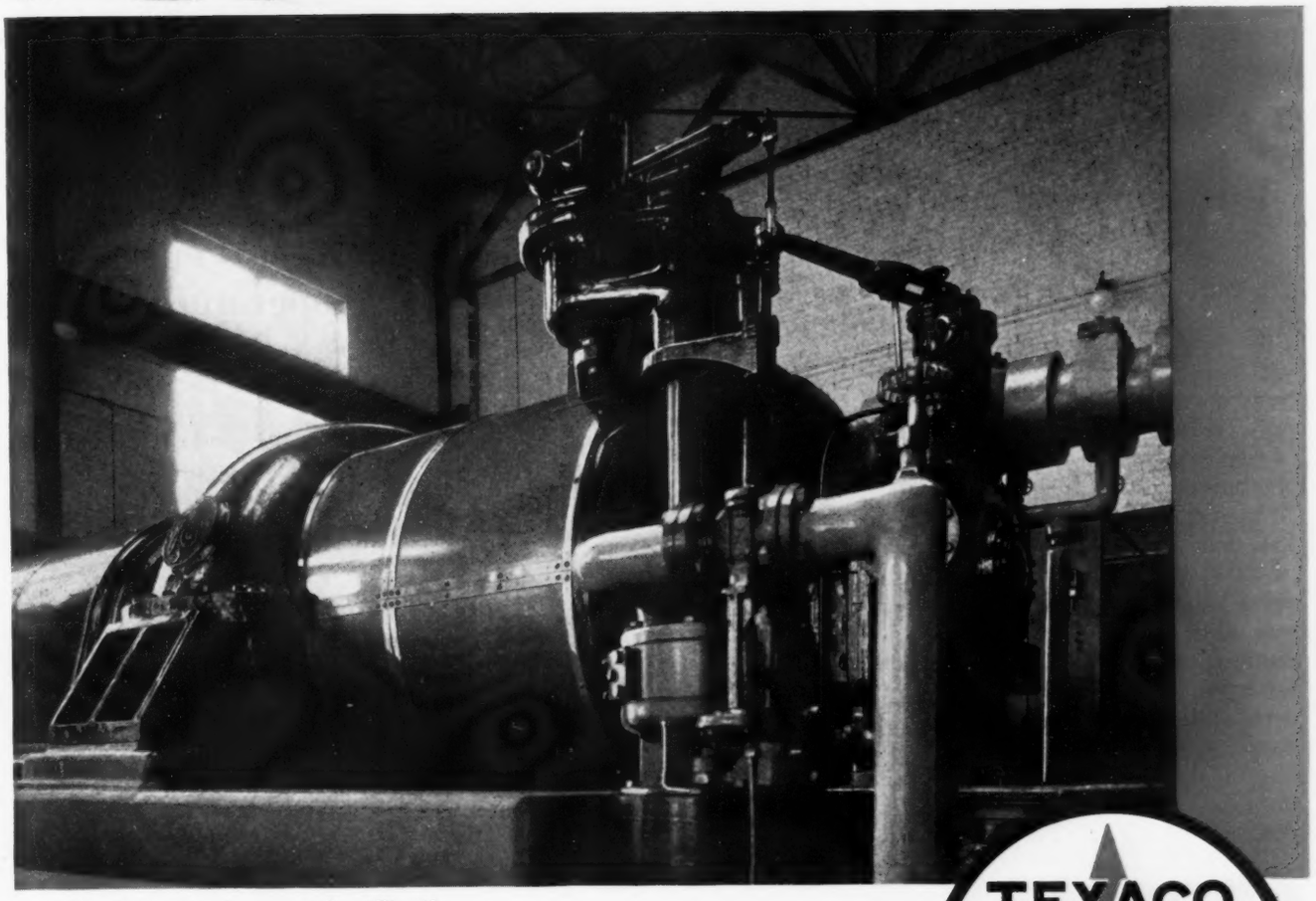
*Excerpt from paper presented to engineering and operating section of Northwest Electric Light and Power Association.

Sight Booth Shows Way to Proper Light

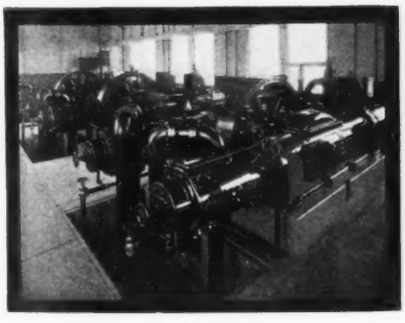
That the story of Better Light-Better Sight can be visualized at fairs, electrical shows and convention exhibits was demonstrated at the National Schoolmart held recently in New York. Public school business officials who were in session in conjunction with the Schoolview meetings selected the amount of light their eyes required for reading a newspaper, a telephone directory, etc. A projector then threw on a screen a duplicate of the Sight-Meter indication so that other callers at the Sight Light Corporation booth could see how much light intensity each visitor at the cabinet chose for good seeing.

The startling result was that the average intensity chosen for reading the newspaper was in excess of 80 foot-candles. That was convincing enough of the great moderation of the 10 foot-candle value recommended as the level at which a teacher should

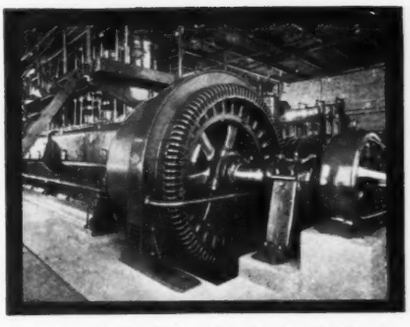
Projector shows image of Sight-Meter indication to gathering



One of the turbine units in the power station at Kincaid



Compressor room at Cabin Creek, Montana



Gas engine at the Baker electric plant in Montana

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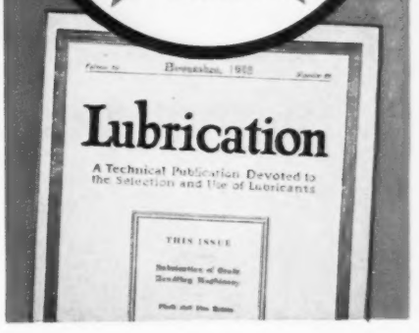

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run up the curtains or turn on the overhead illumination for conservation of pupils' eyesight.

More Output Follows More Factory Light

L. A. S. WOOD
Lighting Division,
Westinghouse Electric & Manufacturing Company, Cleveland

Because better illumination does cut costs, increase efficiency, reduce accidents and establish better working conditions, lighting in industrial plants everywhere will probably be revolutionized in the next few years. At present industrial lighting averages less than 5 foot-candles, one survey of 2,000 industrial plants even averaging below 3, as compared with the safe minimum of 10 foot-candles. Industry is awakening to advantages of better lighting as a result of recent developments in lighting and many industrial lighting surveys. The following are a few examples of many instances where proper illumination definitely increased production:

Proof that good lighting pays its cost is furnished by a national piston company. Plant inadequately lighted. Power company induced lighting test. At the beginning of test plant running at about 70 per cent capacity with lighting intensity of 1.2 foot-candles. In one department lighting was stepped up to 6½ foot-candles; production increased 13 per cent. When further increased to 9 foot-candles an additional 4.9 per cent increase was obtained. Finally lighting increased to 14 foot-candles; production jumped another 6.9 per cent. Lighting of 14 foot-candle intensity increased production 25.8 per cent over old installation.

In inspection department of large roller-bearing manufacturer original system of lighting provided 5 foot-candles at inspection table. Pieces inspected per hour per operator was 408. With new lighting installation providing 20 foot-candles in operation production jumped to 458 pieces per hour per operator, an increase of 12½ per cent. This intensity maintained for two weeks, then decreased to 13 foot-candles and immediately production dropped to 440 pieces per hour per operator. When later set back to 20 foot-candles production increased to its peak.

Hosiery plant—Proper illumination was installed and immediately production of knitting machines jumped 10.8 per cent and of looping machines 6.1 per cent. Cost of installation only four-tenths of 1 per cent and the operating cost 1/10 per cent of yearly payroll.

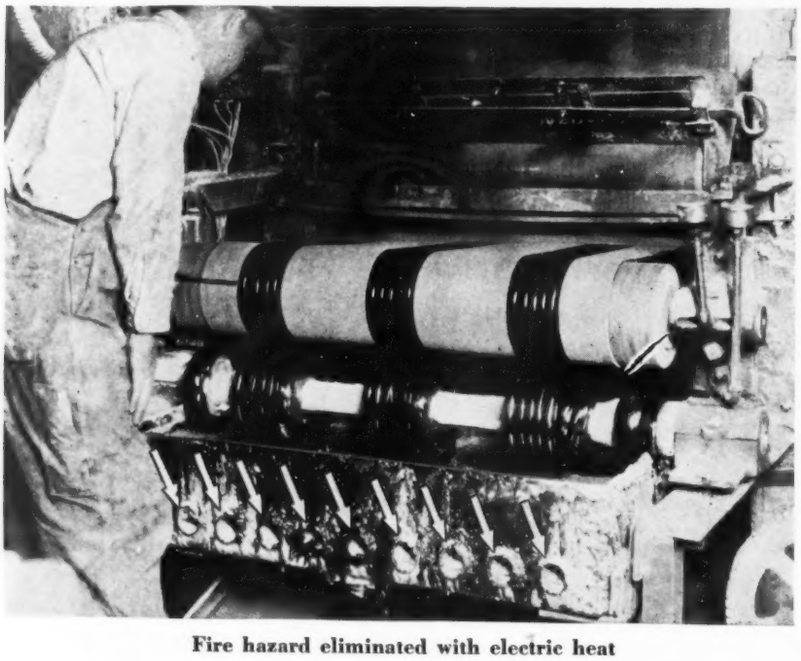
Composing room of a large register company—lighting was old-fashioned, inadequate and spotty. Men at work setting type slow and errors common. Lighting specialist recommended an entirely new system with modern equipment and "Mazda" lamps of proper size. Production increased 6 per cent and only 20 cents per day was added to the light bill.

Plant operating battery of wire-drawing machines—Haphazard system of drop cord lighting replaced with scientifically planned overhead system. Immediately the output of the machines was increased 21 per cent.

Manufacturer of automobile parts—After installing new lighting system which increased lighting intensity 133 per cent, labor turnover dropped from 6.37 per cent per month to 2.78 per cent per month. Work speeded up enough to pay completely for installation in eighteen months.

Safety in Paper Making

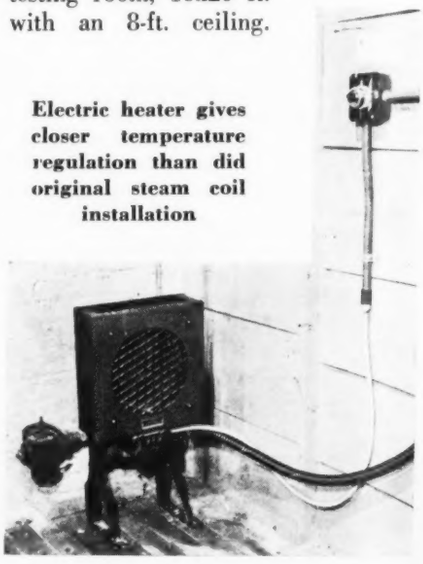
To get rid of the fire hazard constantly present when using fuel fires in asphalt tanks was the initial reason for switching to electric heat in an installation where asphaltum was being applied to roofing paper. The roofing paper traveled through the vat at approximately 300 ft. a minute and in doing so consumed 5 gal. of asphaltum at 370 deg. F. Nine electric strip heaters of 1,000 kw. capacity each solved the problem and at the same time increased the rate of production approximately 20 per cent.



Fire hazard eliminated with electric heat

Temperature Uniform in Special Test Room

At the Brunswick-Balke-Collender Company in Muskegon, Mich., it is necessary to maintain a temperature of 100 deg. F. in a testing room, 16x20 ft. with an 8-ft. ceiling.



Electric heater gives closer temperature regulation than did original steam coil installation

One wall is of 8-in. brick, the remaining three walls and ceiling of ¾-in. boards on one side of 2x4 studding, ½-in. Celotex plus ¾-in. boards on the other. The allowable variation in heating the room is not more than 1 deg. To meet the foregoing specifications and to maintain 100 deg. F., a combination of an electric fan and steam coils to supply and circulate the heat was first installed. This method did not prove to be altogether satisfactory because of variations in steam pressure, for which even a sensitive thermostat to control steam flow could not always compensate.

The steam apparatus was, therefore, removed and replaced by a 4½-kw. electric heater. With the fan allowed to run continuously, the same thermostat as used before has been reconnected to control the electric heating elements directly. The room's temperature is being held readily within the very close limits of the 1 deg. specified.

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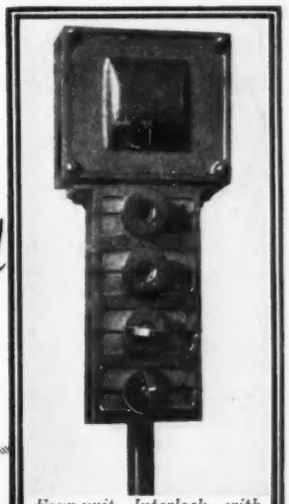
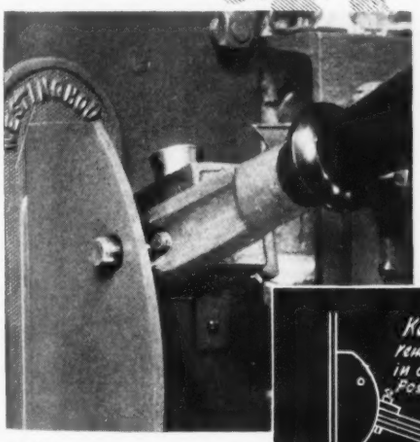
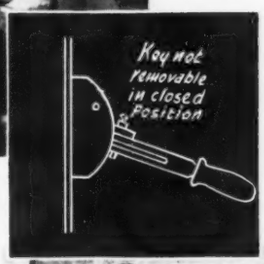


Four-unit Interlock with auxiliary indicating switch.

The simple method of Interlocking all types of equipment.



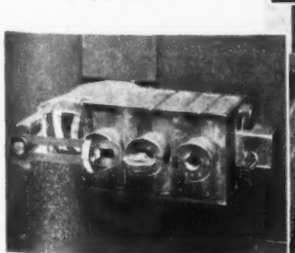
Addition of blinder plate and Kirk Interlock—and, O. C B is ready for interlocking with other equipment.

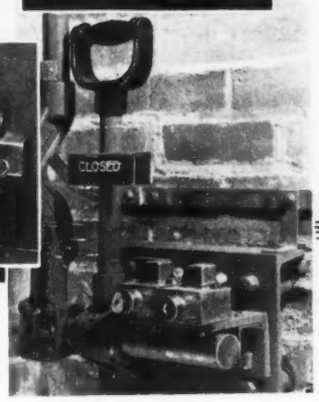


1. POSITIVE ACTION—Key removal locks equipment against both electrical and mechanical operation.
2. MECHANICAL OPERATION—Interlocking accomplished by substantial Everdur bolt—does not rely on electric circuits.
3. INDEFEASIBLE—Cannot be defeated without leaving a visual record of abnormal operation.
4. VISUAL INDICATION—Position of locking bolt indicates whether equipment is locked or unlocked.
5. SIMPLICITY—In design, operation, and installation. Easily applied to any type equipment, without changes thereto.

One of Many Installations Now In Use...

In left top illustration key is removable only after handle is locked in open position. This key then permits unlocking disconnect switch handle (bottom illustration) which when moved to and locked in open position releases second key and retains first one. Second key then unlocks compartment doors, which key cannot then be removed in any manner until doors are relocked.





Above—Door locked—cannot be opened until disconnect key is inserted.
Right — Sequence application to disconnect switch operating handle.

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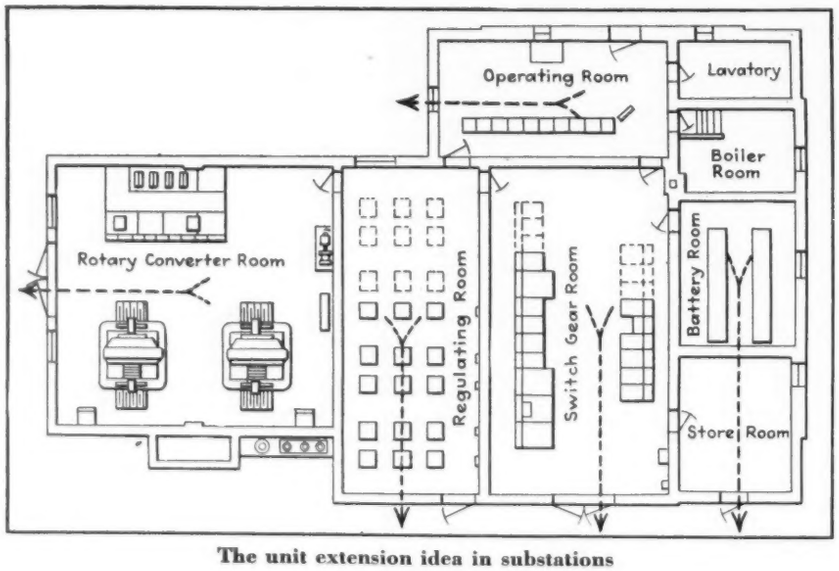
Substation Design Based on Operation

By RICHARD BANZ
Chicago, Ill.

Provision for future growth in electric design is usually expressed in one or sometimes both of two ways. One is to have the lot big enough so that the building can be extended. The other is to have the building big enough so that additional equipment can be installed in it. Sometimes greater attention to provisions for possible expansion might have kept the costs considerably lower.

This is exactly the effort that is made in substation designing by the Public Service Company of Northern Illinois. The accompanying plan offers a good example. This substation was treated, while the design problem was being worked out, as an assembly of functions, structurally unrelated, however close to their union in operation. As it appears in the plan, this substation may be considered to be five separate functional buildings, in one of which are the rotary converters, in the next the regulators, in the third the buses and switching, in the fourth the operating equipment and in the fifth the building services. The reasons for these five buildings being combined into one building are economy and convenience. The problem of future growth is not to be solved by enlargement of a substation, but by expansion of one or more elements of a substation. This being the case, the substation should be so laid out that any one element may be enlarged without any reference whatever to the others.

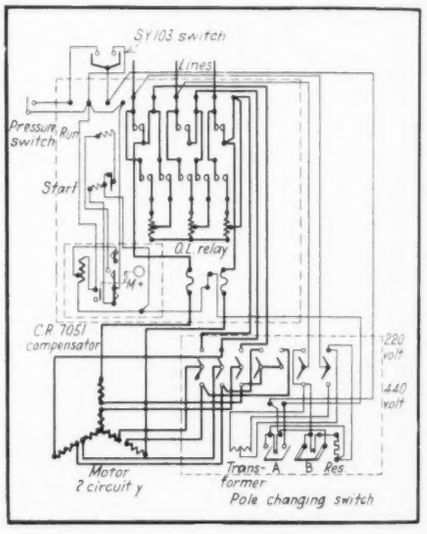
The layout shown illustrates one way of many in which the layout might have been made just as effectively. However, this drawing does show the essential thing, which is that each element is capable of expansion independently of the rest.



The unit extension idea in substations

Portable Dual Voltage Control

An interesting adaptation of standard control equipment arranged for operation on either 220 or 440 volts should find a wide application in industry where portable equipment such as welders, pumps, etc., may be frequently moved from one location to another. To make such portable equipment capable of operation from either 220 or 440-volt, three-phase, 60-cycle circuits by simply throwing the pole-changing switch from one position to another is relatively simple from a manually operated circuit. However, with magnetic control embodying undervoltage and overload protection of the equipment, certain provisions in the remote-control circuit must be made.



Foolproof panel operates portable equipment on either 220 or 440 volts

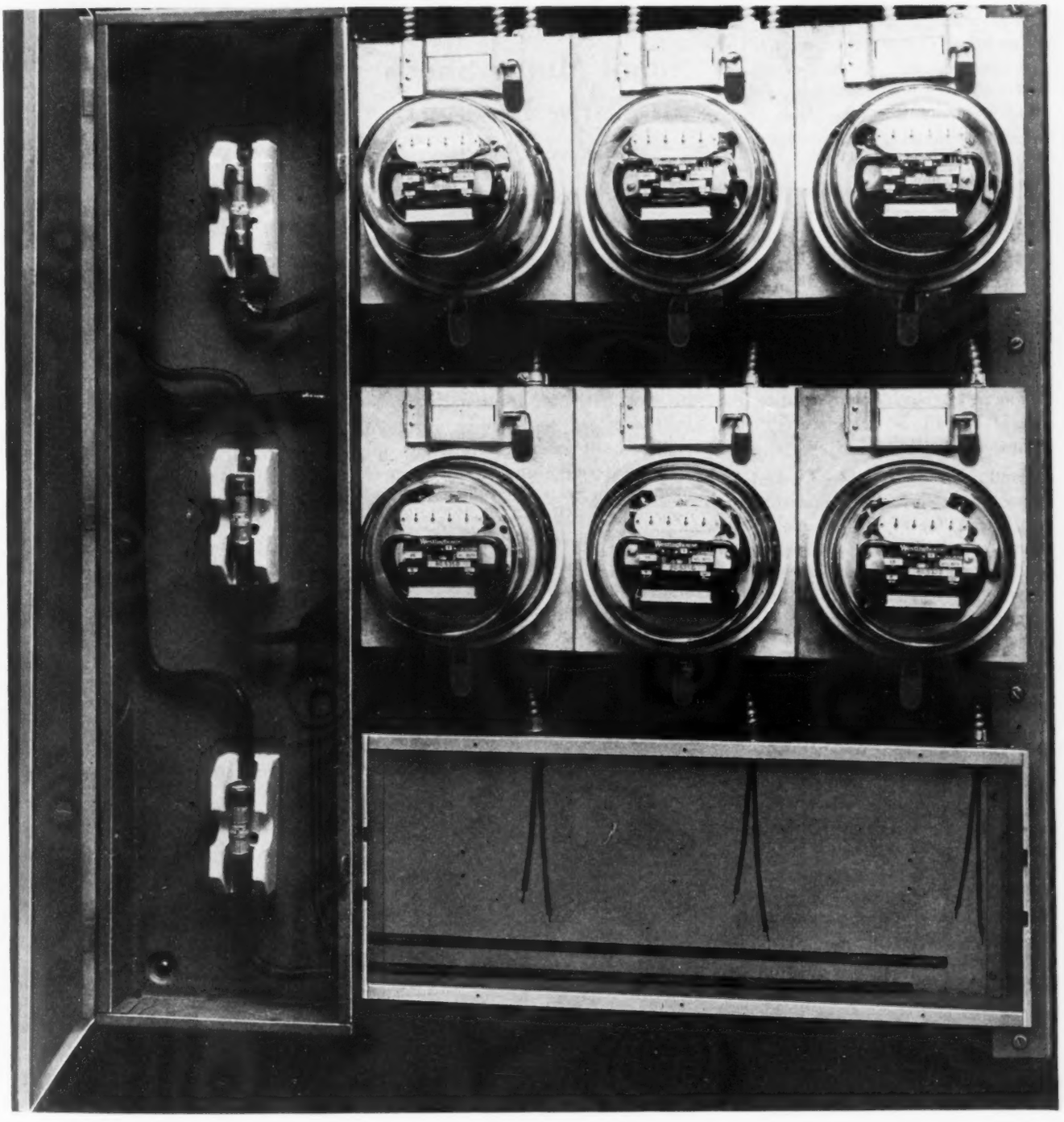
The three-phase motor must be wound with at least two circuits per phase, these two circuits to be operated in series for 440 volts and in multiple for 220 volts. To meet the requirements of dual voltage operation it is essential that the following four conditions be met:

(a) A pole-changing switch must be supplied which will permit the reconnection of the motor circuits from series for 440-volt connection to multiple for 220-volt connection.

(b) Provision must be made for supplying a constant potential (in this case 220 volts) for operating the contactors and relays in the automatic magnetic starter.

(c) Provision must be made to pass the same load current through the thermal overload relay in the automatic starter whether the motor is being operated at 440 or at 220 volts.

ANTICIPATING THE DEMAND



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This new metering equipment used by N. Y. Edison Co. and United Lt. & Pr. Co.—is described by Mr. Albert J. Allen in last issue of "Electrical World."

(d) Provision must be made to prevent energizing of the control circuit of the automatic starter in the event that the pole-changing switch is left in the 220-volt position and 440 volts applied, or vice versa.

Condition (a) is taken care of by an arrangement of a seven-pole, double-throw pole-changing switch. This function utilizes the poles of the switch as shown in the accompanying diagram.

Condition (b) is taken care of by providing a small auto-transformer so connected to the last two poles of the pole-changing switch that, when the switch is in the 440-volt position, this auto-transformer is energized and supplies the control circuit of the automatic starter from its 220-volt secondary. When the pole-changing switch is in the 220-volt position the control circuit is energized directly from the main line.

Condition (c) is taken care of by so arranging the wiring that the current in but one of the two motor circuits passes through the thermal overload relay. Having two circuits per phase, the current flowing through each is the same whether the motor is operated at 220 or 440 volts.

Condition (d) is met by placing two small relays on the pole-changing switch. These relays are energized by the potential across the control circuit of the automatic compensator and are so arranged that they open this control circuit if the potential applied is either 110 or 440 volts. They will operate to close the control circuit only if the applied voltage is the correct value, or 220 volts. If the operator connects the equipment to a 440-volt circuit and leaves the pole-changing switch in the 220-volt position the 440 volts will be applied to the control circuit and one of the normally closed relays will open and de-energize the circuit. Similarly, if the operator connects the equipment to a 220-volt circuit and leaves the pole-changing switch in the 440-volt position the auto-transformer will be energized and will supply only 110 volts to the control circuit. Under these circumstances the normally opened relay will fail to close and the control circuit will not be energized.

Every condition of remote-control operation is provided for in the dual voltage equipment, and at the same time safeguards to prevent injury to the equipment and to improper voltage application have been provided. Standard equipment and parts permit the building of such equipment inexpensively and without complication.

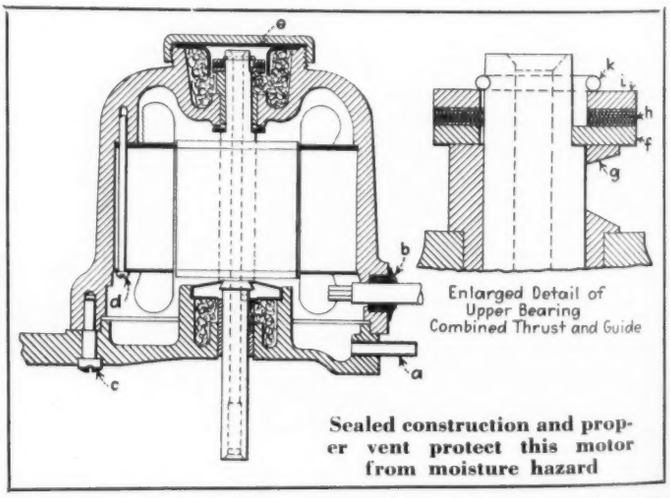
Small Motor Sheds Moisture Hazard

By A. G. SMITH
Small Motor Engineering Section, Westinghouse Electric & Manufacturing Company, East Springfield, Mass.

Air-conditioning service has brought the necessity for small motors designed to prevent damage from humidified air, for if moisture enters an open housing type motor the primary core may rust and sufficient rust may accumulate in the air gap actually to prevent the motor from starting. Totally inclosed moisture-proof motors can be built for large sizes, but only recently have design efforts been made to build a protected motor in small sizes, where fully inclosed motors will not work, by venting the motor housing to a point outside the moist air stream.

Successful elimination of moisture hazard has been accomplished in a motor designed and built for small air conditioners and portable humidifiers. Design is compact and it has a small volume of air inside the motor housing, with breathing hazards overcome by the vent. The sectional view shows a particular design for vertical operation with shaft extension down, permitting inspection of the design details. Motors with these design features have been in service a sufficient length of time to assure that a totally inclosed motor with proper vent will work satisfactorily in a moist air stream, provided the lubrication system and housing construction will not permit water to enter.

A totally inclosed motor housing does not eliminate all of the hazards when the motor is operated in the moist air stream of air-conditioning equipment because the difference in temperature between operation and shutdown periods causes alternate expulsion and suction of the moist air through the bracket fits, around the bracket bolts, etc., with the result that sufficient quantities of moisture are admitted to the housing to cause damage. Even if the housing is made sufficiently tight, in small motors with a small volume of air and large temperature rise, enough moisture to be harmful will enter through the bearing clearances and thus hazard the lubrication system by moisture admission, if no vent for breathing is provided.



Sealed construction and proper vent protect this motor from moisture hazard

Castings are made from aluminum alloy to obtain light weight and corrosion resistance. Bracket fit is arranged inside the frame to shed water and top cap threaded inside for the same purpose. Small copper tube (*a*) vents the motor housing at the lowest point and connection is made to outside the moist area with medical hose. Motor leads are sealed at (*b*) with a rubber bushing compressed by a plate screwed to the frame casting. Bracket screws (*c*) are outside the bracket fit and require no gaskets. Wound primary has a slip fit in the frame casting and is bolted as at (*d*), thus eliminating setscrew holes tapped from outside the frame. Gasket (*e*) inside the loose-threaded cap prevents oil seepage from bearing housing. A hollow shaft is used to simplify oiling so that lower bearing can be oiled from the top through the shaft from which it runs through an outlet hole to the lower bearing. Bearing housings are wool yarn packed and have liberal windows and means provided to assure the yarn contacts the shaft; shaft journals are spiral grooved to pump oil to top of each bearing. The thrust bearing is arranged on top of the upper bearing for accessibility and to allow the lower bearing to act as a guide only and permit removal of the lower bracket and wound primary without disturbing the thrust bearing assembly.

The enlarged view of the thrust bearing assembly shows that it is made up with a polished steel thrust washer (*f*), which has a "D"-shaped hole, the flat side of the hole contacting the flat on the motor shaft, assuring that the thrust washer will always turn with the shaft to carry the thrust against the top of the bronze bearing (*g*). A semi-hard cork washer (*h*) is assembled between the steel thrust washer and the cap washer (*i*), the whole assembly being held on the shaft by a split spring ring placed in a groove in the shaft. The thrust surface is lubricated by the oil pumped to the top of the bearing by the spiral groove in the shaft journal.

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PEDAGOGUES OFF TO LIGHTING SALES SCHOOLS

Climaxing months of intensive preparation for the greatest training program ever attempted by the lighting industry, five corps of instructors recently left Nela Park on a three months' instruction tour that will take them to upward of 60 of the largest cities of the United States, from coast to coast. The accompanying illustration shows one corps, scheduled to travel the Western and Pacific Coast states. Time being at a premium, the group departed by plane to reach their first school in Minneapolis. Left to right—Stephen M. Litscher, Alston Rodgers, Mary Webber and Frank B. Lee

Drought Loads Steam Plants

Prolonged drought over large areas of the country by reducing stream flow has increased loads to be carried by fuel burning plants to record-breaking magnitudes. Output of public utility plants of this type in June exceeded all previous records for that month.

Although the excess for the country as a whole over the previous maximum, in 1930, was only 0.5 per cent, it rose in the Middle Atlantic States to 2.2 per cent, in the West North Central to 17.6 per cent and in the East South Central to 10 per cent over 1930 and 4 per cent over 1929. In the East North Central area the 1930 figure was surpassed, but not that for 1929. Comparisons for six years are shown in the accompanying table.

Continuation of the drought carried all but one of the July, 1934, figures well above June, though due to sharp gains in some earlier years only one new record was set, others being more or less closely approached.

Output from Fuels, June

(Millions of Kw.-Hr.)

Region	1934	1933	1932	1931	1930	1929
United States	4,745*	4,208	3,876	4,643	4,720	4,703
New England	276	307	241	253	283	322
Middle Atlantic	1,454*	1,316	1,284	1,384	1,422	1,411
East No. Central	1,576	1,391	1,249	1,477	1,553	1,588
West No. Central	387*	318	303	344	329	301
South Atlantic	395	321	303	376	405	396
East So. Central	57*	43	42	52	52	55
West So. Central	397	369	351	391	433	392
Mountain	46	40	42	47	48	47
Pacific	157	103	61	319	195	191

*Record for the month.

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Right now you are doing what this man is doing—reading about a finer grade of electrical steel—Sil-con.

And perhaps you are wondering just how much better it is than the steel you are using. There's only one way to find out. Try it.

Put a coil of Sil-con Strip on one of your machines. Watch production speed up. Ask the die shop foreman to examine the die for wear before and after the run. Note the absence of loose scale. See how little scrap loss there is. Watch how easily the flat laminations stack. Then take a completed unit to the test block and compare electrical performance.

This procedure has sold Sil-con to dozens of manufacturers who, frankly, were sceptical at the beginning, but who, after the test, realized that Sil-con Strip showed the same electrical performance as the finest sheet of equivalent grade.

Made in five grades—Armature, Electrical, Special Motor, Special Dynamo and Regular Transformer.

REPUBLIC STEEL CORPORATION

GENERAL OFFICES YOUNGSTOWN, OHIO

Licensed under patents 1,867,818; 1,932,306 to 1,932,309 inclusive; and other patents applied for.

"Free Electricity" in Milwaukee

Results of an experiment in offering unlimited use of service in the months of May and June for the amount of the March bill

DURING the recent free kilowatt-hour offer of the Milwaukee Electric Railway & Light Company homes, stores and nearby farms used 6,624,649 kw.-hr. of free electricity. The plan permitted residence, rural and commercial lighting consumers to use an unlimited amount of electric service for the two monthly meter reading periods beginning in April and May at a monthly cost no greater than for the monthly meter reading period ending in March. The extra electricity used was free.

A summary of the results of the experiment shows that an average of 62,186 consumers, or 28.7 per cent of those eligible to participate, took advantage of the offer and used 6,624,649 kw.-hr. more in the two months than they did in March. This represents an average increase for each of the two months of 50.6 per cent over the March consumption of the same customers.

Residential consumers, constituting the largest group, obtained 4,231,681 free kilowatt-hours. In that group 53,304 customers, or 28.1 per cent of those eligible, increased their consumption an average of 71.3 per cent for each month.

Rural consumers made the largest proportionate increase in use of electricity. In that classification 1,616 customers, or 53.2 per cent of those eligible, used an excess of 383,048 kw.-hr., an average increase for each of the two months of 133.5 per cent over March.

In the commercial lighting group 7,266 consumers, or 30.8 per cent of those eligible, used an excess of 2,009,920 kw.-hr. This was an average increase for each month of 29.1 per cent over March.

Wide variations were found between different customers in the amount of extra electricity consumed. Some used only a little more per month and some used from ten to fifteen times their usual amount. In many cases electric heaters were used to supplement the furnace. Brighter lighting of homes and stores also accounted for increased consumption. Electrical dealers reported larger sales of ranges, refrigerators and other appliances, many consumers apparently having purchased desired electrical conveniences in time to take advantage of free electricity.

The purpose of the offer was to stimulate consumption of electricity by demonstrating the advantages of its more liberal use. Surplus electricity from water power plants in upper Michigan nad northern Wisconsin was transmitted to Milwaukee.

The actual increase in consumption resulting from this stimulus was really more than is indicated by the accompanying table. As G. W. Van Derzee, vice-president and general manager, points out, normal consumption in May and June is less than in March. A study in Chicago reported in ELECTRICAL WORLD, November 12, 1932, showed the average domestic consumption in May 82 per cent and in June 78.5 per cent of the local March total. May consumption in Milwaukee was therefore perhaps 115 per cent and June consumption 106 per cent over normal for these months.

•

Publicity Policy Committee Appointed by N.E.M.A.

With the purpose of establishing a more complete understanding of the electrical manufacturing industry on the part of the general public the board of governors of the National Electrical Manufacturers Association has authorized the formation of a publicity policy committee. President J. S. Tritle has appointed the following five N.E.M.A. members to make recommendation on this subject: Robert Edwards, chairman Edwards & Company, Inc.; Dwight Phelps, Colt's Patent Fire Arms Manufacturing Company; W. E. Sprackling, Anaconda Wire & Cable Company; B. W. Kerr, Railway & Industrial Engineering Company, and P. L. Thompson, Western Electric Company, Inc. The committee expects to make its first report at the annual meeting.

Free Electricity in Milwaukee—Who Used It, and How Much

	Number of Customers			Kilowatt-Hours Used			Average Kw.-Hr. Used per Customer			
	Eligible	Participating	% Participating	By Participating Customers	in March by Part. Cust.	in Excess Over March	By Participating Customers	in March by Part. Customers	in Excess Over March	% Increase Over March
Residential Service										
May	189,919	56,964	30.0	5,382,080	3,047,019	2,335,061	94.5	53.6	40.9	76.8
June	189,919	49,645	26.1	4,793,357	2,896,737	1,896,620	96.5	58.4	38.1	65.4
Totals	.....	106,609	....	10,175,437	5,943,756	4,231,681	....	....	....	....
Average	189,919	53,304	28.1	.....	.....	.....	96.4	56.8	39.6	71.3
Rural Service										
May	3,035	1,550	51.1	306,850	135,397	171,453	198.0	87.3	110.7	126.6
June	3,035	1,681	55.4	363,485	151,890	211,595	216.0	90.3	125.7	139.2
Totals	.....	3,231	....	670,335	287,287	383,048	....	....	....	....
Average	3,035	1,616	53.2	.....	.....	.....	207.0	90.3	125.7	133.5
Commercial Lighting Service (Includes Optional Secondary Lighting)										
May	23,554	7,547	32.0	3,941,920	3,114,710	827,210	522	413	109	26.6
June	23,554	6,985	29.7	4,937,071	3,754,361	1,182,710	706	536	170	31.5
Totals	.....	14,532	....	8,878,991	6,869,071	2,009,920	....	....	....	....
Average	23,554	7,266	30.8	.....	.....	.....	609	472	137	29.3
Totals—Three Groups										
May	216,508	66,061	30.5	9,630,850	6,297,126	3,333,724	....	....	....	52.9
June	216,508	58,311	26.9	10,093,913	6,802,988	3,290,925	....	....	....	48.4
Totals	.....	124,372	....	19,724,763	13,100,114	6,624,649	....	....	....	....
Average	216,508	62,186	28.7	.....	.....	.....	....	....	....	50.6

Revenue Rising—but Slowly

Substantial growth in domestic energy use contributed largely to bring this year's July utility revenue 2.3 per cent above last year's, but industrial power sales are lagging.

REVENUE of electric light and power companies continues to show moderate gains compared with 1933. The total from ultimate consumers for July was $146,529,400, according to the Edison Electric Institute, or 2.3 per cent more than a year ago and only 0.5 per cent less than in June. The latter decrease was smaller than usual. An upward change was first recorded in midsummer of 1933, and revenues have since been running somewhat ahead of the amounts received a year earlier except during the last three months of that year. The rate of increase rose to 5.2 per cent in April, but has lately been shrinking, going to 4.8 per cent in May and 2.8 per cent in June.

Energy output was 7,138,000,000 kw.-hr., a gain of 1.6 per cent compared with the month last year and 1.3 per cent over June, although the average daily production was 1.9 per cent less. There was a further decrease, caused by drought conditions, in output from water power. It fell to 34 per cent of the total and was 7.6 per cent less than a year ago, against 7 per cent more from fuels. New England alone generated more hydro and less thermal energy than in July, 1933.

Of the various consumer classes, energy sales to domestic customers scored the greatest rate of increase, 10.2 per cent. Retail commercial sales rose 4.7 per cent. For the first time in many months wholesale commercial sales were less than in the preceding year, with a decrease of 3.0 per cent.

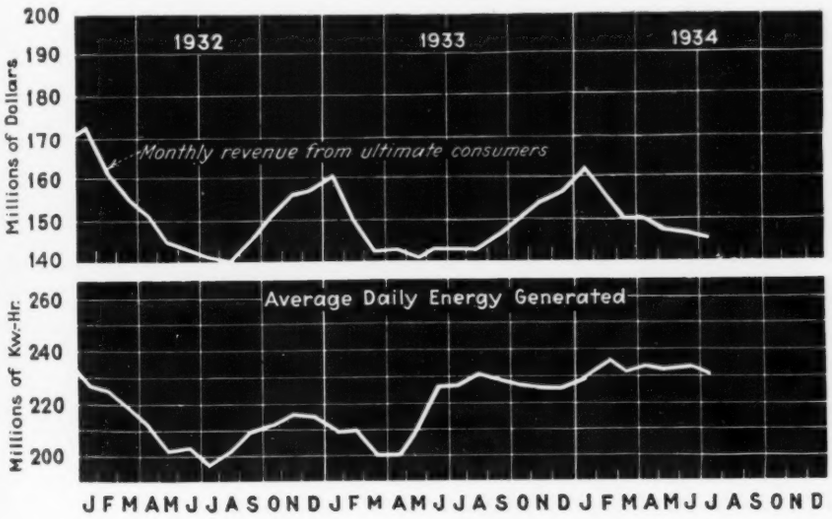

1932
1933
1934
Millions of Dollars
Monthly revenue from ultimate consumers
Average Daily Energy Generated
Millions of Kw.-Hr.
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D

Table I—Monthly Revenue from Ultimate Consumers and Energy Output of Central Stations in the United States

Compared with Corresponding Month of Previous Year

Month 1934	Revenue from Ultimate Consumers		Energy Generated, Millions of Kw.-Hr.*					
			Total		Hydro		Fuel	
	Thousands of Dollars	Per Cent Inc.	Gen.	Per Cent Inc.	Gen.	Per Cent Inc.	Gen.	Per Cent Inc.
July	146,529	+2.3	7,138	+ 1.6	2,426	— 7.6	4,712	+ 7.0
June	147,337	+2.8	7,039	+ 3.7	2,512	—11.2	4,527	+14.2
May	147,915	+4.8	7,193	+ 9.3	2,990	— 7.2	4,203	+25.2
April	149,852	+5.2	6,981	+15.2	3,282	+11.4	3,699	+18.8

Table II—Regional Revenue and Energy Output in July, 1934

Compared with Corresponding Month of Previous Year

Geographical Region	Revenue from Ult. Consumers		Energy Generated, Millions of Kw.-Hr.*					
			Total		Hydro		Fuel	
	Thousands of Dollars	Per Cent Inc.	Gen.	Per Cent Inc.	Gen.	Per Cent Inc.	Gen.	Per Cent Inc.
United States	146,529	+2.3	7,138	+1.6	2,426	— 7.6	4,712	+ 7.0
New England	12,355	+1.5	465	—5.0	163	+14.7	302	—12.8
Middle Atlantic	41,853	+2.1	1,727	+0.4	400	— 7.7	1,327	+ 3.2
East No. Central	33,545	+1.4	1,659	+2.0	100	—23.5	1,559	+ 4.3
West No. Central	12,838	+6.1	480	+5.0	82	—25.8	398	+14.8
South Atlantic	17,882	—0.2	815	—0.6	400	—10.2	415	+10.2
East So. Central			297	+4.0	237	— 0.5	60	+26.2
West So. Central	8,446	+4.0	404	+6.0	4	—56.8	400	+ 7.3
Mountain	4,314	+1.7	227	—6.1	175	—14.0	52	+36.0
Pacific	15,296	+5.1	1,064	+7.8	865	— 4.5	199	+144.0

*By courtesy of U. S. Geological Survey, with deductions for operations not regarded as central station.

More customers

After several years of decline the number of customers is now definitely on the up-grade. In July there were 585,000 more domestic and 615,000 more total customers than a year earlier. For the twelve-month period ended with July the average annual consumption of the former rose to 617 kw.-hr. from 600 kw.-hr. for the preceding like period, the average rate dropped to 5.37 cents from 5.55 cents and the average monthly bill decreased 2 cents to $2.76. Despite falling rates the increase from 866,876,000 kw.-hr. in July, 1933, to 955,691,000 kw.-hr. in this class accounts for nearly the entire $3,300,000 rise in revenue.

Table III—Allocation of Energy, July, 1934

Compared with Corresponding Month of Previous Year

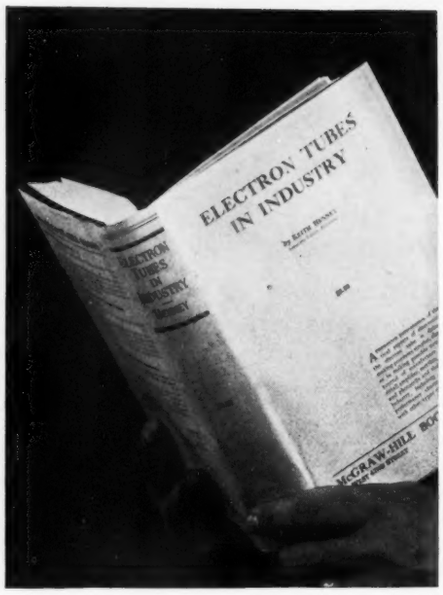
Class of Service	Millions of Kw.-Hr.	Per Cent Inc.
Total for distribution*	7,116	+ 0.8
Lost in transmission, etc.	1,308	+ 0.7
Sold to ultimate consumers	5,808	+ 0.8
Domestic	956	+10.2
Com'l, small light and power	1,060	+ 4.7
Com'l, large light and power	3,212	— 3.0
Municipal street lighting	150	+ 0.1
Railways—street, interurban	324	+ 7.4
Railroads—electrified steam	53	— 4.7
Municipal and miscellaneous	53	—15.1

*Generated, purchased from other sources, imported, less energy used in railway and other departments.

Telling

the engineer and manufacturer

what is being done with electron tubes *in industry—and how it is being done*



"The electron tube acting alone or in combination is a useful tool; time alone will tell how important it becomes in industry," says Keith Henney in this book. He then describes the various electron tubes that are useful in industrial operations and discusses their applications to industry in motor control, laboratory measurements, power transmission, elevator leveling, counting, sorting, grading, color matching, chemical and mechanical measurement, process control, etc.

JUST PUBLISHED

Electron Tubes in Industry

Applications of Electron Tubes discussed in this book—

Time delay relays
Welding control
Illumination control
High speed counting
Flux meters
Testing camera shutters
Register control
Paper bag manufacture
Traffic and train control
Exposure meters
Illumination meters
Smoke density control
Thickness control
Humidity control
Chemical analysis
Recording wire diameter
Photometry
High speed press control
Vacuum tube voltmeters
Automatic recorders
Telemetering
Elevator control
Color matching
Sorting and grading
Door openers
Voltage and speed regulation
Battery charging
Viscosity tests
Precision automatic testing
Tube wattmeter
Noise measurement
Conveyor synchronization
Temperature control
Inversion (d.c. to a.c.)
Rectification (a.c. to d.c.)

By KEITH HENNEY
Associate Editor, *Electronics*

490 *pages*, 6 x 9, *illustrated*, $5.00

ENGINEERS and manufacturing executives interested in cheapening or quickening industrial processes will find in this book a thorough presentation of the practical aspects of electronics—what the electron tube is doing toward making processes simpler, cheaper, safer, and in making possible new methods of control. The book describes all the various electron tubes that are useful in industrial operations, such as amplifier tubes, high-vacuum tubes, rectifier tubes, mercury vapor tubes, thyratrons, grid-glow tubes, oscillator tubes, ballast tubes, voltage and current regulators, cathode-ray tubes, X-ray tubes, photoelectric tubes, ionization gages, glow tubes.

The book is specific; it tells what is being done with tubes in industry now and how it is being done. It indicates the possibilities of the extended use of these tubes. In all possible cases the economics of each application is discussed. The book shows how much the electron tube system costs in a given instance compared with other competing systems.

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Utilities Cite Domestic Load Problem to Inspectors

Utility speakers appearing before the thirtieth annual convention of the Western Section, I.A.E.I., at Cincinnati, Ohio, September 10 to 13, registered a frank appeal for industry co-ordination in maximating the market now offered by lower rate inducements and greater domestic energy consumption. Hugh C. Blackwell, president Union Gas & Electric Company, Cincinnati, pointed out that the idle increment of production and service facilities, as compared with the low saturation point of domestic consumption, offered great prospects for new values of domestic load building. He praised the industry for the development of inexpensive yet safe materials and equipment.

Speaking for a simplified set of wiring standards, E. A. Brand, engineer Niagara Hudson Power Company, Buffalo, N. Y., pointed out that utility engineering practices have always enjoyed freedom from precedent in the consideration of new methods, and asked that this principle be observed in adapting the National Electrical Code to new developments to provide safe yet economical wiring.

A proposed revision of the N.E.C., based on the 1933 edition, was presented to the meeting, after having been under consideration by utility committees for four years. While not claimed to be in complete form, its essential purpose, as drafted, is to separate fundamentals of wiring practice from the detailed standards. A further aim is to assemble field data for an illustrative methods manual.

•

Electrical Rise World-Wide

Gradual industrial recovery on a world-wide scale is indicated by the rising electrical energy consumption reported from abroad. Output of British plants during the first seven months of the year was 17 per cent greater in 1934 than in 1933. In Germany, according to "Foreign Trade Notes" of the Electrical Equipment Division, Bureau of Foreign and Domestic Commerce, production statistics covering most of the industry show an increase in 1934 of 15 per cent over 1933 and 25 per cent over 1932 for the first six months.

In Denmark the second quarter's output increased 33.7 per cent over the corresponding period of 1933;

from Hungary comes the statement that Budapest power houses report an increase of approximately 10 per cent in the consumption of electric current, due entirely to increased industrial use. Spain showed considerable improvement during the first four months of 1934, compared with a like period of the previous year. There has been a percentage gain annually during all the depression years. In Athens, Greece, output during the first six months of 1934 was 16 per cent larger than in the same months of 1933. Industrial power increased 26 per cent.

Czechoslovakia is rapidly electrifying the provinces of Moravia and Silesia; $40,000,000 has been spent for the purpose; electricity is available to 80 per cent of the inhabitants; another $10,000,000 will be spent before the work is completed.

•

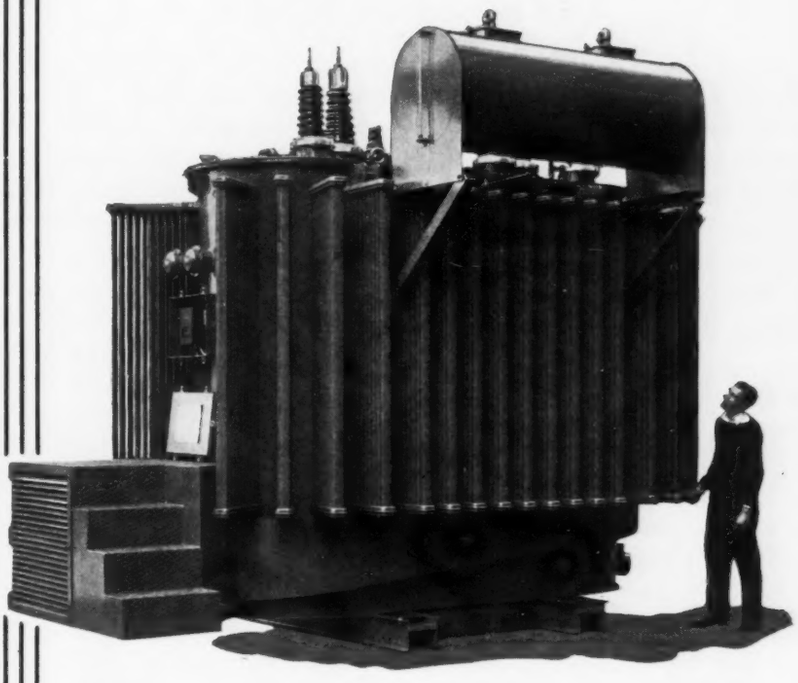
To Stimulate Rural Electrification

Finding it impossible to make periodical calls on each of their 6,500 rural customers, the California Oregon Power Company and the Mountain States Power Company publish a monthly news bulletin entitled the *Farm Electrical News* to show their active interest in rural customers and to gain their confidence and good will.

PORTABLE KITCHEN FOR T.V.A.

The T.V.A. electric kitchen leaves Knoxville at the start of a tour of northern Mississippi and northern Alabama towns served by T.V.A. power and Electric Home and Farm Authority financing of low-cost household appliances. Electric Home and Farm Authority is sponsoring the kitchen tour to tell housewives how cheap electric power can serve them. Household service demonstrations will be conducted by Miss Ruth Frow of the E.H.F.A. staff, using a complete portable kitchen

•Let Pennsylvania save you money!



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When you modernize your lighting systems make them permanent with the modern troublefree wire—ROCKBESTOS.

For Pendants

Every lighting pendant is a potential source of trouble because the baking temperature in the socket dries out and crumbles usual insulations. ROCKBESTOS Heatproof Flexible Cord, insulated with felted and impregnated asbestos (no rubber) is unaffected by heat.

For Hot-Spot Pendants

Here not only the portion of the cord in the socket but the entire cord is subject to deterioration from heat. ROCKBESTOS Cab Cord has, in addition to heatproof asbestos insulation, a non-deteriorating asbestos jacket to give the needed protection in such places.

For Lighting Circuits

Whether in conduit or open, heat dries up ordinary wire insulation causing outage and making replacement necessary. Avoid this with ROCKBESTOS A.V.C. Boiler Room Wire which is immune to heat, moisture, fumes, oil or grease. Its use means permanent satisfaction.

Let us send you samples of these wires so you can see for yourself why they are best and most economical for these uses. ROCKBESTOS PRODUCTS CORPORATION, New Haven, Conn.

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—the wire with permanent insulation

ROCKBESTOS PRODUCTS CORP.
New Haven, Conn.

Please send me samples of your lighting wires.

Signed .....

Company .....

City ..... State .....

Recent Rate Changes

Appalachian Electric Power Company has reduced its electric rates to residential users in Virginia $186,000 a year, or approximately 15 per cent of the total now paid.

•

Broad River Power Company's new rate schedules, approved by the South Carolina Railroad Commission, will save consumers of electricity approximately $127,000 annually.

•

Ohio Electric Power Company's application to reduce electric rates in Oberlin has been refused by the State Utilities Commission on the ground that the proposed rate schedule would result in operation below cost.

•

Columbus Railway, Power & Light Company's compromise electric rates have been adopted by the City Council. Council's acceptance is subject to approval of voters on November 6. The present proposal would save consumers approximately $735,000 annually, or about 18 per cent.

•

Telluride Power Company was granted an interlocutory injunction by a three-judge federal court in Salt Lake City which stopped the state of Utah, Gov. Henry H. Blood and the state Public Utilities Commission from reducing electric light and power rates. The commission had ordered a 10 per cent reduction.

•

Georgia Power & Light Company has accepted without further contest the order of the commission reducing rates 18 per cent. The reduction will save consumers approximately $66,000 annually.

•

Dayton Power & Light Company has voluntarily offered the city of Dayton a reduction in power rates in a schedule filed with the city commission covering the five years beginning October 1, 1934. The reduction would save consumers approximately $1,827,580 during the period.

•

Northern States Power Company has reached an agreement with the St. Paul City Council on twenty-year electric, gas and steam franchises to be presented to the voters November 6. Included in the agreement is a reduction of $350,000 in electric rates.

How Customers Sell Themselves

[*Continued from page 24*]

In a store the story is told to the owner, the manager and the head buyer and each sells himself; in the factory to the plant superintendent, the production manager, the electrical man and the purchasing agent, with such others as may be brought in. In each case the purpose is to dramatize an unnoticed opportunity, which will so stir the interest and imagination of the customer that he will want to have a lighting engineer survey the plant and prepare specific recommendations for better lighting.

Consumers Power Company at Jackson, Mich., has worked out the new approach to commercial lighting most successfully. It set up a balanced program based on the science of seeing with personal selling, backed up with lighting schools for architects, contractors and dealers; a financing service on wiring and equipment up to $200 and an advertising campaign featured "dramatized seeing." Special attention was given to stores, windows, signs, floodlighting, schools, office buildings, coal yards and greenhouses, with applied advertising directed to each.

The company has added ten more men to its commercial lighting staff and in the first eight months of this year 465 interior lighting improvements, 168 window-lighting jobs and 1,107 signs resulted.

J. F. Mayo, in charge of the campaign in Jackson, says: "The new method of approach is far more effective than any other tool we have used. We can highly recommend the new kit to other utilities, for aside from its revenue-producing possibilities the good will created through its use alone justifies the cost, time and effort expended."

A fine industrial job has been done in and around Binghamton in the territory of the Associated Gas & Electric system. Here the power opportunity is concentrated in four large industries. One man made 125 calls, resulting in fifteen installations, totaling 104 kw. and $3,700 estimated annual revenue, at a cost of 25 cents per dollar of yearly revenue. H. M. Sharp, manager of the lighting department in Elmira, who was then in charge, stresses the importance of working to improve one department in a factory in the first operation as a demonstration of what better illumination will do.

Jobbers should be kept informed of recommendations, Sharp says, so that they will know what their customers are doing, and the recommendation of equipment that is non-competitive should be avoided so that everybody has a chance to bid. Trial installations they found were very seldom necessary. Sometimes, however, it is necessary to hang up a single unit, where the customer cannot visualize the effects that will be gained.

Many interesting stories are coming in from over the country showing

There are 100 foot-candles in this table top, because the man who occupies this office convinced himself that light can help him do his work

how this growing interest and activity are building up. In one city a demonstration was given last fall to a local paint dealer. Recently he was called in to redecorate some lodge rooms, and he immediately pointed out the possibilities for relighting. In another case a municipal plant agitation sprung up, but the business men of the community protested and killed it. Investigation showed that they had been largely influenced by a recent canvass of commercial and industrial customers based on the science of seeing. They felt that the power company was working for the interests of its customers and should be protected.

All of this indicates that the new movement in lighting will have a most helpful influence on public relations. It is a contribution to public welfare and will be recognized as such.

•

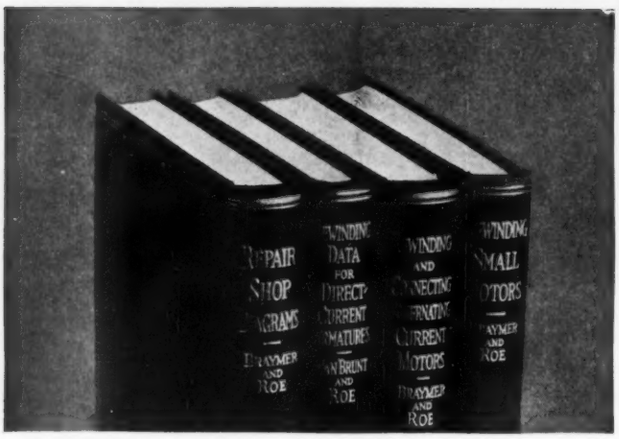
What Price Dealer Co-operation

Pacific Gas & Electric Company, working in conjunction with the Electric Appliance Society of Northern California, has launched a special campaign on electric washing machine and ironer sales in its territory. This is one of a number of similar co-operative campaigns conducted by the Electric Appliance Society in promoting the sale of electric appliances. The Pacific Gas & Electric Company, a member of this organization, does not itself sell these two appliances, but is contributing the following co-operation:

1. Displays on the floors of some 65 business offices during the entire month of September.
2. Sixty demonstrators in its various public offices demonstrating the many features of the electric ironer.
3. A three-colored bill sticker on some 516,000 electric bills going to domestic consumers.
4. An essay contest on the merits of the electric washing machine and ironer in its monthly periodical that is delivered to consumers.
5. Special feature window displays of the electric washing machines and ironers in all its 65 business offices.
6. Special meetings with the local dealers and representatives of the newspapers to promote intensive local interest in the campaign and work up tie-in advertising to go along with the large advertisements financed by the Electric Appliance Society.
7. Dealer broadsides to all the dealers in the territory and to all the newspapers.

Some 250,000 people visit P.G.&E. business offices each month and will see these displays. All of the dealer appliances placed on the floors of the utility's business offices during this campaign will carry a courtesy card showing the name of the local dealer or dealers selling the particular washing machine or ironer.

Display floors, display windows and floor demonstrations are limited to only those manufacturers' and distributors' models who have contributed to the Electric Appliance Society's special campaign fund, in which the Pacific Gas & Electric Company matches dollar for dollar whatever amount is put up by them.



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—testing and locating faults in small alternating-current motors before stripping them
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—laying out and connecting a pyramidal winding
—how to make voltage changes in induction motors
—how to make alternating-current windings for different frequencies
—laying out wave windings for alternating-current rotors.
—complete rules for frog-leg windings
—how to lay out and check up three phase diagrams

There are 1,079 pages of practical shop methods and data like these in this Library. It is a complete, up-to-date key to the repair of all motors. Nothing else in it; every page filled with definite, practical facts for the industrial maintenance man and the electric shop worker.

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Send Electric Motor Repair Library for 10 days' examination on approval. In 10 days I will send $2.00, plus few cents postage, and $2.00 monthly for four months, or return books postpaid. (We pay postage on orders accompanied by remittance of first installment.)

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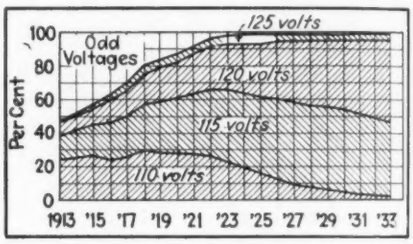
Lamp Sales Show Trend to 120 Volts

By SAMUEL G. HIBBEN
Director of Applied Lighting
Westinghouse Lamp Company,
Bloomfield, N. J.

Consumption of 120-volt lamps in 1933, for the first time, exceeded the sale of 115-volt lamps. During the calendar year 1931 the domestic consumption of the 115-volt "Mazda" lamps constituted approximately 48 per cent of the total, while 120-volt lamps accounted for a little less than 44 per cent. In 1932 the sale of these two voltages was practically equal.

Last year there was a shift from other voltages of something more than one-half of 1 per cent of the



"Mazda" lamp sales show 120 volts takes the lead

total lamp sales into either 115- or 120-volt lamps, which, taken together, now represent almost 93 per cent of the total. The demand for 110-volt lamps continues to decrease, while 125-volt lamps show a very slight increase. Ever since 1919 the sales of 110-volt lamps have been less than those of 115-volt. Twenty years ago more than half of the domestic consumption was of odd voltage types, some higher than 125; others lower than 110 volts.

It is interesting to note the trend of standardization within the past two years. Comparing 1933 with 1931, the demand for 115-volt ratings has shrunk by about 5.8 per cent, while concurrently the consumption of 120-volt types has increased by about 8.4 per cent. A number of central-station properties have standardized on 120 volts in the past few years, and for that reason it seems quite likely that this rating will continue to be in the majority. Approximately one-half of the consumer demand for 125-volt lamps rises from the misapplication of this rating in sockets that properly should be supplied with lamps of a lower rating.

Obviously, the further reductions

of odd voltages tends toward a simplification of the lamp business and a lowering of the cost of light to the average consumer. This has been recognized by the electric light companies, which have had the foresight to develop their programs in this direction. Great care and effort are daily being exercised to provide a constant and uniform voltage at the customers' lamp sockets.

•

False Economy of Fewer Street Lights

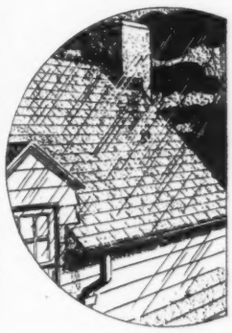
The false economy of reducing the illumination on major streets and parkways has gruesomely been brought home to the residents of St. Louis, Mo. Statistics compiled by the St. Louis Safety Council have revealed that since the city, in March, 1932, cut down streets lights as an economy measure there has been an increase in the number of automobile accidents between 6 p.m. and 6 a.m. In its economy drive the city reduced the illumination on its streets 45 per cent, including a 33 per cent cut in major street and parkway lighting.

In 1931 the ratio of automobile accident fatalities that occurred from accidents between 6 p.m. and 6 a.m. was only 52 per cent. In 1932 the ratio was increased to 55 per cent, in 1933 to 61 per cent and this year the rate has been running 62.5 per cent. This has occurred despite the fact that the total registration of automobiles in St. Louis has decreased for several years, being last year 27.5 per cent below the previous year. There was a 6 per cent increase in fatal automobile accidents between darkness and dawn.

Back in 1932 accidents of all kinds occurring at night were 45 per cent of the total for the city. In 1933 the percentage was 47 and in the first six months of this year it mounted to 49.6 per cent. The figures show that the percentage of pedestrian fatalities between 6 p.m. and 6 a.m. is abnormally high.

Reyburn Hoffman, secretary-manager of the council, in commenting on the accident statistics said they prove that good street illumination is essential, especially in the winter months when dark clothing is worn, when hours of dusk and darkness are at a maximum and when weather is murky and visibility is at the lowest.

When Preparation Provides Protection



SYSTEMATIC inspection and maintenance of brushes, brush holders, commutators and slip rings provide longer brush life, more satisfactory performance and freedom from expensive shut-downs.

Now is the time, with load and service conditions normal, to prepare for the sustained loads and heavy peaks of winter service.

INSTALL NATIONAL PYRAMID BRUSHES

N C C

NATIONAL PYRAMID BRUSHES

meet these exacting demands and keep the wheels of industry turning

NATIONAL CARBON COMPANY, INC.
Carbon Sales Division, Cleveland, Ohio
Unit of Union Carbide UCC and Carbon Corporation
Branch Sales Offices: New York • Pittsburgh • Chicago • San Francisco

Electric Bond and Share Company

Two Rector Street
New York

FIBREX TREE WIRE

At all seasons of the year wherever trees come in contact with your lines there is a place where FIBREX can serve you. Recent tests show FIBREX to stand up under many times as much abrasion as ordinary tree wire. It is the standard by which buyers should judge tree wire quality.

SIMPLEX WIRE & CABLE CO.
79 Sidney St., Cambridge A
Boston, Mass.

Electric Heat Cures Rubber

[*Continued from page 35*]

press has no effect on any other press. This is very important, as different classes of work require different temperatures. Temperatures are changed by a simple adjustment on the control instrument. An indicating dial shows the operator what the temperature is on the platens at all times.

Results are readily duplicated once the proper time and temperature cycle has been determined. Former difficulties caused by erratic steam traps, sticky valves, variations in steam pressure and steam leaks are eliminated.

Maintenance costs (reduced approximately $300 per month) are considerably lower than on a high-pressure steam system. There are no swivel joints to keep tight, no steam line leaks and no steam traps to keep in operation. Corrosion and deterioration of equipment, floors, walls and piping, due to the former humid, foggy atmosphere, are eliminated.

Less floor space is required for these electrically heated presses than for steam-heated presses with their auxiliary equipment, such as the boiler plant, steam lines, traps, etc., and elimination of the latter around the platens made them more accessible.

A brief description of the application of electric heaters to platen presses will show its simplicity. The presses referred to are hydraulically operated and equipped with heated plates or platens of different sizes, namely, 40 in. long x 40 in. wide, 36 in. long x 36 in. wide and 30 in. long x 30 in. wide. The thickness varied from 1½ to 3 in. Chromalox heating units of the refractory-embedded type were used throughout in electrifying all platens. These heaters, 1½ in. wide and approximately $\frac{5}{16}$ in. thick, were installed in the 40 x 40-in. platens by making each platen in two sections, then milling out slots in one section. The heaters were installed in the slotted half and the other half bolted to the slotted half to serve as a clamping plate. All other platens were converted by taking the old platens originally used for steam and clamping the Chromalox strip heaters to them by means of steel plates.

In all instances care was taken to insure good metal-to-metal contact between the heaters and the metal plates. This is very important to obtain uniform temperature and to provide the correct amount of heat.

New Approach Gets Results

[*Continued from page 28*]

marginal customers can be covered with demonstrations (not mere calls) every two years. Omitting the poorest class of domestic customers, say 30 per cent, and the top 10 per cent, 60 per cent of the domestic customers should be covered in two years. Based on three demonstrations a day, this would require one domestic contact for every 2,500 domestic customers (total). For commercial contacts to be covered in two years, one salesman is needed for every 1,700 commercial meters.

If the residential representatives are women, one should be selected in advance for every group of five representatives to supervise the others, talk before groups, make certain that proper merchandise is available at proper sources, and obtain leads.

Personal qualifications for the work involve more than a previous knowledge of lighting. Furthermore, it has been found that individuals who have developed in a purely service-type of work are not necessarily adequately trained. They must have selling ability—not the high-pressure type, but the kind that makes customers sell themselves. This is made easier by the new demonstrational approach.

Before the selling representatives are engaged, the utility's entire personnel should be educated in at least the rudiments of the science of seeing so they will have a lively interest in lighting. Then revamp the lighting of their homes so they will become neighborhood examples.

After the foregoing has been done, selection, organization and training of commercial and domestic lighting representatives can proceed. They can't be hurtled through a two- or three-day training course and cast out by themselves, kit in hand, and expected to do an effective selling job.

While it has been contended that the merchandising department can't do the home-lighting job, the lighting sales department must co-operate with it and industrial sales engineers. If a commercial representative can add around 140 kw. per year and a residential contact around 160 kw. per year, and both can increase consumption around 10 per cent at a cost of about 50 cents per dollar of annual revenue, lighting activities can be very profitable. And the accompanying results seem to prove it is.

How Lighting Activities Offset Declining Revenues of Commercial Customers

Striking examples of how commercial lighting activities reversed or checked seriously declining revenues. Observe the change from a 14 per cent annual decline trend to only —2.9 per cent; from —11 per cent to +10 per cent, and an over-all change from —6 per cent trend to +4.7 per cent, or approximately 11 per cent improvement.

Before the activity the average annual consumption of the customers was 1,270 kw.-hr. Based on the over-all improvement, there has been an increase of 140 kw.-hr. per year per customer. On a 6-cent rate there would thus be a $7.80 increase in revenue per year per call.

No additional load was sold on any of the 92 calls indicated, but the usage was increased by making them all more conscious of the value of proper illumination.

(Prepared by Elmira (N. Y.) Water, Heat & Light Company for period Feb. 15, 1933, to Sept. 2, 1933)

Division	No. Calls	Billing for Previous Year Before Call	Billing for Year After Call Was Made	Increase or Decrease (per Cent)	Annual Trend Before Activity (per Cent)
Northern Penn Power 3,100 meters	26	6,634	7,587	+14.3	—2
New York Central 2,390 meters	25	19,174	21,103	+10	—11
Elmira Group 1,900 meters	41	21,429	20,802	—2.9	—14
Total.....	92	47,237	49,492	+ 4.7	—6

Results of Home Demonstrations During First 17 Weeks

Actual work started April 1, 1934, on San Joaquin Light & Power System

(a) Total demonstrations made (average 2.2 per day per girl)	939
(b) Total recommendations—96% of (a)	902
(c) Total immediate installations made—21% of (a)	194
(d) Total homes on which call-backs were made—11% of (b)	96
(e) Total of call-backs making changes—85% of (d)	82
(f) Total watts recommended	556,535
(g) Average watts per home recommended	618
(h) Average watts sold in all homes making changes—immediate installations plus call-backs (c) and (e)	284
(i) Average watts per home installed in 82 call-back homes	411
(j) Average watts installed in original installations (194 homes)	230
(k) Total wattage installed in 276 homes, about which positive information is available	78,405
(l) Number of shades recommended (in 902 homes)	4,677
(m) Number of portable lamps recommended (in 902 homes)	1,171
(n) Number of fixtures recommended (in 902 homes)	248
(o) Number of bulbs recommended (in 902 homes)	10,684
(p) Number of shades sold (82 homes)	498
(q) Number of portable lamps sold (82 homes)	78
(r) Number of fixtures sold (82 homes)	39
(s) Number of bulbs sold (276 homes)	1,435

Again results demonstrate that executives should not expect maximum performance at outset. After a period of training it took two weeks to get going, so results now are better than averages would indicate. Immediate installations, consisting of additional or larger bulbs, were added, as result of first call. Not until fifth week, or after 223 demonstrations, were bulbs sold to customers by demonstrators.

Unless call-backs are made within two or three weeks after demonstrations, recommendations are less likely to be adopted. May require as many as four call-backs per recommendation. Subsequent additions occur chiefly in homes on which call-backs are made. More additions may have been made than indicated; only those checked are recorded. Increased usage of lighting can only be determined after a sufficient time has elapsed to study comparable periods and other uses are deducted. Leaving sight-meters or sample shades with customers stimulates self-selling and aids call-backs.

One supervisor and five girls were used or 4,000 meters per girl; 1,500 meters per girl would afford better coverage. Leads come from (a) response to supervisor's letters to customers, 43 per cent; (b) personal friends of representatives (in first six months), 20 per cent; satisfied customers, 20 per cent; employee leads, 12 per cent. Advertising develops atmosphere and breaks down sales resistance. Direct requests and dealer leads are improving.

Results just received for five months (April to August inclusive) show: 1,133 demonstrations; 114 call-backs; 88 per cent of call-backs make changes; 678,855 total additional watts recommended; a slight reduction in average watts added per home (381), probably due to hot weather; sales expense ($4,457, including salaries, autos and miscellaneous) of $11 per connected kilowatt; estimated annual revenue of load connected, $10,306; added revenue per dollar of sales expense, $2.31.

Readers Congratulate Us

[*Continued from page 29*]

not only hope, but believe, that your readers generally will have about the same opinion. I think the new form presents news items more attractively and in a more logical arrangement.

I do want to say, too, that your changing over to the biweekly issue is a good move.

W. K. VANDERPOEL,
Vice-President.

New York Edison Company

I think the form of the new issue is fine, and making it a fortnightly ought to help keep the quality at high level.

A. H. KEHOE,
Vice-President.

Reliable Electric Company

The new ELECTRICAL WORLD seems to be off to a wonderful start. We think the book is more attractive to advertisers than before. At the same time we admire your restraint in not doing a *Saturday Evening Post* by continuing each article through ten pages of ads. The average subscriber should be able to follow the news columns and items that interest him more easily than by the system of weekly doses. And editorially, this first issue sets itself a real standard to live up to. Congratulations.

JOHN BROWN COOK,
President.

Ohio Brass Company

We like your new ELECTRICAL WORLD. From our standpoint, you're getting just as much into every-other-week issues as you did when you did it every week. It certainly is a very useful, intelligent and dependable trade magazine. It hurts me to say these kind words to you, but they are true.

G. L. DRAFFEN,
Vice-President.

Babcock & Wilcox Company

I want to take this opportunity of telling you what an excellent job I think you have done, and to tell you that I cannot help admiring the way in which you have greatly improved this publication by the many important changes made in make-up and arrangement, when the frequency of publication was changed from weekly to biweekly. To my mind these changes indicate very alert management, especially as they were made in a publication of such known excellence as ELECTRICAL WORLD. You are indeed to be congratulated on having made it even better than it ever was.

W. A. CATHER,
Manager Advertising Division.

Moloney Electric Company

If my memory serves me right I have been reading ELECTRICAL WORLD for better than forty years. In that time we have all seen the record of progress made in the electrical industry as has been reflected in the pages of ELECTRICAL WORLD. These changes have been constant but gradual, and few of us really appreciate them in their entirety.

There has been a change, however, in a part of this electrical industry which is a major operation. The new ELECTRICAL WORLD as of September 1 is most significant. I believe many epochal changes are immediately ahead in the electrical industry, and evidently ELECTRICAL WORLD has anticipated these and in its new dress is ready for what's ahead.

The new frequency of issue will give us all more time to digest its contents. The segregation of information under the various departments is timely. The interspersing of reading matter and advertising pages is a real break for the advertisers, but it imposes upon the advertiser a task of making his advertisements news to compare with the text of the paper.

J. J. MULLEN,
Vice-President.

Palmer Electric & Manufacturing Co.

I dislike using the word "improvement" with reference to your publication, but I can say that this number is in very attractive form.

G. E. PALMER,
President.

Detroit Electric Furnace Company

I think your new book is a remarkable improvement. My sincere congratulations!

E. P. LOVEJOY,
General Manager.

General Cable Corporation

In reviewing the new ELECTRICAL WORLD I find that it covers all the features which you outlined to me a short time ago. It is a different paper entirely, and I am quite sure will create considerable additional reader interest. We look to ELECTRICAL WORLD as the outstanding journal of the electrical industry, and personally I consider it in the line-up first to feature our products.

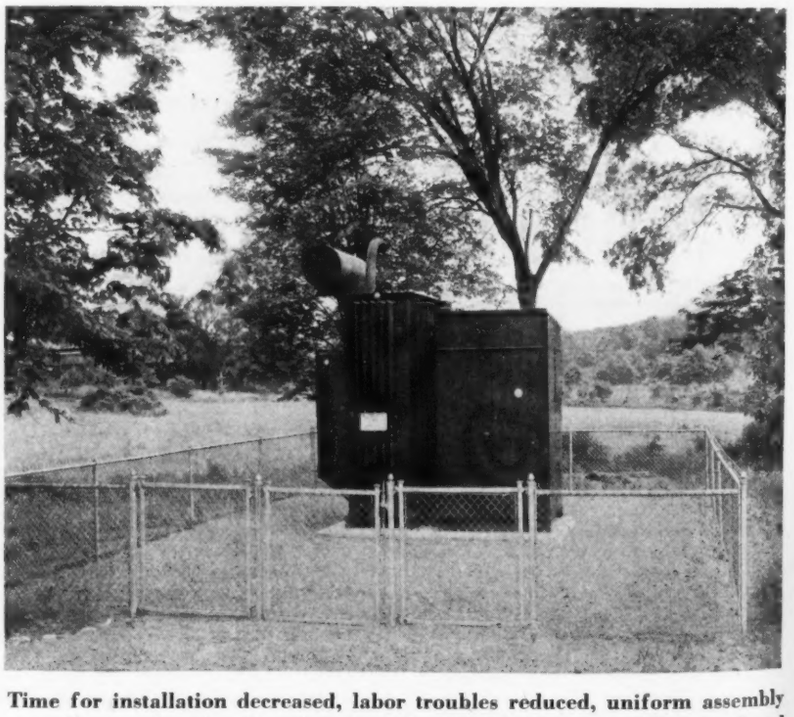
GEORGE SHERRY,
Sales Promotion Manager.

Westinghouse Augments Kitchen Planning Service

Two all-electric display kitchens have been announced by Reese Mills, manager of the range and water heater department of the Westinghouse Electric & Manufacturing Company. These kitchens augment the all-electric kitchen planning service maintained by the range and water heater department as a service, not only to the Westinghouse dealers and distributors, but also to the hundreds of customers throughout the United States who are planning to install all-electric kitchens in their homes.

Kitchen No. 1, the smaller of the two units, is built in a half-hexagon figure, so that the element of display may be heightened. It is built so that it is portable, easily packed and crated, and the major electrical equipment is installed at the point of display. It is so constructed that it takes standard sizes of the Westinghouse range, dishwasher and refrigerator. Other auxiliary appliances are added after the kitchen is set up. Kitchen No. 2 is of the semi-usable type, being so constructed that the cabinets may be used for cooking schools and demonstration work. It is 18 ft. long, having end cabinets for storage.

FACTORY-BUILT SUB—A DOLLAR-SAVING IDEA



Time for installation decreased, labor troubles reduced, uniform assembly to perform substation functions and the elimination of unsightly steel and wood structures. These are some of the advantages in buying a complete factory-built substation. This is a 750-kw. substation of this type installed by the Central Hudson Gas & Electric Corporation

Stocks for Immediate Delivery

Through Graybar's 74 Warehouses

THOMAS INSULATORS

Hundreds of Utilities have found Thomas Porcelain Insulators more economical in the long run. Their superior quality and permanence guarantees you better insulator performance for a longer period of time.

THE R. THOMAS & SONS CO.
LISBON, OHIO

OSHKOSH

POLE LINE CONSTRUCTION TOOLS
EXTRA HANDLES

Reels	Lug Hooks
Diggers	Pole Supports
Barricades	Tree Trimmers and Saws
Warning Signs	Tamping Bars
Ladders	Digging Bars
Peavies	Shovels and Spoons
Cant Hooks	Pike Poles

Sold and Stocked by
GRAYBAR ELECTRIC CO.
Manufactured By
LEACH COMPANY, Oshkosh, Wis.

Reliable

STANDARD
HEAD
SOLDERLESS
CONNECTORS

A strong and efficient hardware bronze connector. The reversible nut, pilot to help thread the nut, rounded slot edges and precision cut threads make this connector an outstanding product.

Reliable Electric Co., Chicago

All Items on this Page and "Everything Electrical"

GraybaR QUALITY Since 1869 — Distributed and guaranteed by GraybaR ELECTRIC COMPANY

Offices in 74 principal cities

MERCOID-TRIPLEX TIME SWITCH

HAS MANY OUTSTANDING FEATURES WHICH MAKE IT DESIRABLE WHERE ACCURACY AND DEPENDABILITY ARE REQUIRED

Equipped with Waltham movement, synchronous motor and mercury switch to guard against corrosion, pitting, or open arcing.

Different types available for various applications. Write for Bulletin No. 115.

THE MERCOID CORPORATION
Sole Manufacturers of The Mercoid Switch
4217 Belmont Avenue - - CHICAGO, ILL.

Overhead or Underground Splice the Modern Way with NATIONAL SLEEVES

Double Tube Sleeve

No matter what your splicing requirements, there's a National Sleeve the correct type and the exact size to do the job most efficiently. Ask the Graybar Man About National:—

- Double Tube Sleeves.
- Nicopress Sleeves.
- Seamless Single Tube Sleeves.
- Split Tinned Copper Underground Connectors
- Tinned Copper Cable Sleeves

Underground Cable Connector

The National Telephone Supply Co.
Cleveland, Ohio

If it's a Splice make it a National

WESTERN RED Cedar Poles NORTHERN WHITE

NATIONAL POLE AND TREATING CO., Minneapolis, Minn.

TREATED OR UNTREATED, ROOFED, GAINED, BORED, OR STAINED,
STOCKED FOR IMMEDIATE DELIVERY

NATIONAL 1934 PERMEX

YARDS AND TREATING PLANTS:
EVERETT, WASH. SPOKANE, WASH.
SAND POINT, IDAHO
MINNESOTA TRANSFER, MINN.

FINEST IN PLIERS

Electricians and linemen everywhere know Klein Pliers—the standard of quality "since 1857." The Klein line includes side cutting, oblique cutting, end cutting, diagonal, long nose, duck bill, and a wide variety of other patterns to fit every electrician's need. For the finest work be sure the pliers in your hands are the finest, too—Kleins.

Foreign Distributor: International Standard Electric Corporation, 67 Broad Street, New York

Mathias KLEIN & Sons
Established 1857 — Chicago, Ill. USA
3200 BELMONT AVE., CHICAGO

Rugged
J-D
Porcelain

One-Piece Pin-Type Insulators

Superior Service
Since 1922

Superior Science in Manufacture;
Have Earned Your Patronage

Jeffery-Dewitt Insulator Co.
Kenova,
W. Va.

PIONEERS FOR YEARS

GROUNDOMETERS
and accessories

For measuring the resistance of earth electrodes. (Ground tests)

Duplex Probe

Complete outfit

BORDEN ELECTRIC CO.
Summit New Jersey

"COPPERWELD"
WIRE, STRAND, GROUND RODS

Nada BRONZE
WIRE and CABLE
Bare and Weatherproof

COPPERWELD STEEL COMPANY
GLASSPORT, PA.

Uniformly high in quality, meeting the most rigid specifications.

COPPER
WIRE and CABLE
... Bare and Weatherproof

LETTERS TO THE EDITOR

Ideas on Advertising

To the Editor of ELECTRICAL WORLD:

In a recent issue of the ELECTRICAL WORLD, which came to my attention, the advertisement of the Gould Storage Battery Corporation appealed to me as an example which could be followed by others to their advantage. It not only described the product but it included information relative to capacities and dimensions that would permit an engineer to answer the questions "Can it be used in the space available?" and "Will it do the work?" accurately enough for preliminary purposes.

As I understand the subject, the intent of an advertisement is to inform prospective customers that a certain product exists, what it will do, and promote an interest which will lead toward sales.

Why, then, do so many convey little information, aside from the address of the advertisers and a clue to what they produce? Many of them are wonderful examples of the arts of illustration and printing, but we doubt if their esthetic value carries much weight with engineers or purchasing agents.

Does the advertiser fear that competitors will learn something about the product? If so, why? All the others have to do is to buy a sample through a dummy agent and examine it at their leisure.

Are the advertisements only lures to draw an excuse for a call by a salesman? If so, is that good business? Why go to the expense of sending a salesman merely to furnish information that could have been in the customer's hands long before through the medium of the advertisements?

Too often salesmen who appear prematurely, following a request for a catalog or other source of information, are so anxious to be helpful (?) that they hurt their own cause; or, finding that the inquiry was in connection with future possibilities only, show their disgust rather too freely for the welfare of their sales record.

Is there a fear that a possible customer may use obsolete data and blame the advertiser, if trouble results? If so, why? Isn't the use of obsolete catalogs, blue-prints, etc., just as likely to be productive of complaints? Isn't the answer in the printed or stamped statement they usually carry? "This data for preliminary use only. Do not use for construction." Why not apply it to advertisements and include more technical data?

It would seem that advertisements in journals designed to appeal to technical men should include a certain amount of technical data, aside from the purely descriptive text.

We have heard of two cases which are good examples of the assistance that an advertisement can furnish to a possible customer. The first case involved the possibility of installing a certain type of heating boiler in a given space. A cut was available showing photographs from two viewpoints. On the originals had been lettered the general dimensions and the sizes and types of fittings needed, up to a certain point in the piping. The text included the capacity, if used under comparable conditions. The result was the boiler was practically sold before the salesman appeared on the scene.

In the second case a description and photograph of a special bend produced by a pipe manufacturing company appeared in one of its advertisements. Appended was a statement giving the limits within which it could produce that particular type of bend. In an emergency the data were drawn from an engineer's file; the capacity was there; a rush order resulted and, if we remember rightly, in spite of dire predictions by the purchasing agent, the work was satisfactory and the bill presented was fair to all concerned.

Probably many readers could tell of similar incidents; it would be interesting to hear from them and also to hear the advertisers' views on the subject. It does not seem unreasonable to suggest that from time to time enough technical data shall be supplied, as a part of an advertising campaign, to permit the engineers of a prospective customer to make a quick study that will answer the questions previously mentioned.

G. M. DURGIN,
Wollaston, Mass.

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What Are Fixed Charges?

To the Editor of ELECTRICAL WORLD:

In your issue of August 4, 1934, page 145, in an article on "Energy Cost at the Substation," the author of the article found it necessary to state explicitly what items he includes in "fixed charges." This is necessary in each case, because every one seems to include different things in this term. The author of the above article includes items that no one would ever consider a fixed charge unless it is explicitly included. Taxes on taxable income cannot be fixed by any stretch of the imagination, because the income itself is not fixed. Depreciation is not considered a fixed charge by the majority of accountants.

There seems to be a great need for a definition of the term. Even though it is not used in formal utility accounting, it is used a great deal by utilities in their estimates, statements, etc. To my

mind a fixed charge should be exactly what the term implies, anything that does not vary with the kilowatt-hours. It is not so important to have the definition correct as it is to have it definite.

M. M. SAMUELS.
Washington, D. C.

•

Across-the-Line Motor Starting

To the Editor of ELECTRICAL WORLD:

The admirable article by Geo. H. Hall in the ELECTRICAL WORLD for August 25 on the subject of motor starting and control equipment does not take full account of modern trends in across-the-line starting of induction motors.

Motor-starting equipment of the reduced voltage type is notoriously less rugged and simple than the induction motors controlled by it. Automatic and remote starting of induction motors have been made needlessly expensive and complicated by blanket rules requiring reduced voltage starting. Actual installations have shown there is no great problem involved in starting 500 to 1,000-hp. motors across the line where the power supply system is of the proper capacity. It follows that for systems of proper capacity a blanket requirement that motors of 5 and/or 7½-hp. rating be provided with reduced voltage starting borders on the absurd.

The size and capacity of the power supply system determines the size motor that can be thrown across the line without annoying voltage fluctuations. Except for motor-drive applications which require a low starting torque, the voltage fluctuation is the only limiting factor in such starting. There are no limitations inherent in the motors themselves.

An isolated plant of a few hundred or few thousand kilowatts capacity with mixed power and lighting load on the same feeders constitutes one problem in the application of across-the-line starting. Another and entirely different problem is presented when a motor is connected to a large system of several hundred thousand kilowatts with large substation and feeder capacity and where the service capacity at the motor is large in proportion to the individual motor rating.

Proper analyses of the limiting factors on utility and isolated systems, as well as intelligent application of starting equipment by industrial engineers, can easily effect substantial savings in capital expenditures and maintenance costs if across-the-line starting is used to a greater extent. A blanket prohibition or a requirement in a set of service rules which is a relic of the days of small systems should not be permitted to stand in the way of engineering progress.

L. C. PETERMAN,
Ford, Bacon & Davis, Inc.,
New York.

. . . . This new RELIABLE connector is gaining immediate acceptance . . .

Reliable SERVICE ENTRANCE CONNECTORS

1. One Piece
2. Easily installed
3. Won't vibrate loose
4. Permanent joint
5. No radio interference
6. Save time in installation
7. Lower cost
8. No heating

Depend on Reliable Service Entrance Connectors to increase secondary distribution economy. Standardize on this low-priced connector because it is simple to use, saves time, and has great strength.

Get some samples of the new Reliable Service Entrance Connector. See the amount of abuse they will stand. Give them any tests you want. They are designed for the job.

There are no sharp edges to nick wire. Made entirely of high strength bronze —97 per cent copper.

Will take any combination of 6 or 8 B&S solid or strand. Sold in standard packages of 100.

Don't forget there is a sample ready for your inspection—it's free.

Send for Sample

Reliable Electric Company
3145 Carroll Ave., Chicago

Distributed by GraybaR ELECTRIC COMPANY
OFFICES IN ALL PRINCIPAL CITIES

MEN OF THE INDUSTRY

M. Cary New Vice-President of Florida Properties

Miles Cary, formerly vice-president and general manager of the Long Island Water Corporation, has been appointed vice-president and general manager of the Florida Public Service Company with headquarters at Orlando. Both these utilities are units in the Associated Gas & Electric System. Mr. Cary's connection with the Associated System began immediately following the World War, when he became engineer for the Pennsylvania Electric Company at Clearfield in 1919. He became identified with the Penn Public Service Corporation, Johnstown, Pa., in 1920 as general superintendent of construction and maintenance and was appointed general manager of Long Island Water Corporation in 1930.

Previous to his Associated service, he was connected with Pocahontas Consolidated Collieries Company, Pocahontas, Va., for several years as chief electrician in charge of power plants and of four mines. He served in an engineering capacity with other coal companies and utilities until 1918.

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Edwin Jowett Retires

Edwin Jowett, vice-president in charge of power production of the Kansas City (Mo.) Power & Light Company, will retire October 1 after completing 50 years of active service. Mr. Jowett has been in charge of the building and development of the Northeast station, the Grand Avenue station and the various auxiliary institutions. He has had much to do with the labor problems in connection with those properties, as well as with the technical problems which had to be met in order to develop an economical power system.

After obtaining extensive operating experience with various utility companies in the Middle West, Mr. Jowett was appointed assistant general manager of the Kansas City Power & Light Company in the spring of 1918. During his association with the Kansas City properties he has been actively identified with civic affairs and with the representative engineering societies, including the American Institute of Electric Engineers, Missouri Association of Public Utilities, American Society of Mechanical Engineers, the old National Electric Light Association and the Kansas City Electric Club.

Mr. Jowett will continue as a consultant for the Kansas City Power & Light Company and in that capacity will remain in touch with the operations of the company.

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Queens Utility Announces New Executive Assignments

Several important changes in the organization of the New York & Queens Electric Light & Power Company have recently been announced. Charles A. Barton, general sales manager, has been elected vice-president in charge of sales, and L. J. Montgomery has been appointed general sales manager.

Under the new plan the company has been split into three divisions, each directed by a vice-president. Lawence A. Coleman, senior vice-president, will have charge of the fiscal, accounting, auditing, purchasing, stores and personnel activities. Harold C. Dean, vice-president of engineering, will continue to direct the engineering, construction, operating, distribution, transportation, meter and testing departments. Charles A. Barton, the new vice-president in charge of sales, will have charge of sales, commercial relations, industrial power engineering, lighting, district offices, advertising and home economics activities.

L. J. Montgomery

Mr. Barton, before being made vice-president, was general sales manager of the company for 22 years. Following his graduation from the Massachusetts Institute of Technology, he was employed by the General Electric Company for ten years and was chief engineer and general manager of the Canadian plant.

C. A. Barton

L. J. Montgomery, who succeeds Mr. Barton as general sales manager, has been assistant general sales manager since 1917. He was first employed as a district agent in 1911 and one year later was promoted to power engineer, which position he continued to hold until he was made assistant general sales manager. He is a graduate in electrical engineering of Pratt Institute, Brooklyn.

•

▶ WALTER C. BECKJORD has been elected to the recently created position of vice-president and general manager of the Columbia Gas & Electric Corporation, it was announced last week after a meeting of the directors. Mr. Beckjord, who will probably be in charge of the natural gas business of the Columbia system, has spent more than twenty years in the service of gas companies in the Koppers-Mellon group. Since 1929 he has been vice-president and general manager of the Boston Consolidated Gas Company.

▶ GOODRICH W. LINEWEAVER of Norfolk, Va., has been elected secretary of the Federal Power Commission. A native of Harrisonburg, Va., with wide newspaper experience in Virginia and West Virginia, Mr. Lineweaver has specialized in utility and power problems and rate matters, in insurance and other rate investigations, tax and state and municipal governmental affairs, serving in various investigations on state committees and commissions. He has long been associated with the Norfolk *Ledger-Dispatch*, serving for ten years on the

editorial staff and as special and legislative correspondent. From 1905 to 1912 he was engaged in reportorial work and correspondence in Richmond and other cities, and from 1913 to 1917 was editor and general manager of the Harrisonburg *News-Record*.

▶ CHARLES F. BOYNTON, who is connected with the uniform legislation department of the National Electrical Manufacturers Association, has been appointed to the directorate of the Rehabilitation and Modernization Association of New York City. The purpose of the association ties in very closely with the program of the Federal Housing Administration. Mr. Boynton will retain his identity with the N.E.M.A. uniform legislation department as heretofore.

▶ DANIEL I. SULTAN of Mississippi has been appointed a member of the Public Utilities Commission of the District of Columbia, to succeed Commissioner John C. Gotwals. Mr. Sultan is a Lieutenant-Colonel in the Corps of Engineers of the United States Army.

▶ M. B. JONES, president of the New England Telephone & Telegraph Company since 1919 and for many years previously identified with the public utility law firm of Powers, Hall & Jones, Boston, has resigned as of September 30 to become chairman of the board. He is to be succeeded by John J. Robinson, whose career from cable splicer's assistant to operating vice-president of the New York Telephone Company has made him widely known in both communication and Eastern power company circles.

ARTHUR W. PINKHAM, president of the National City Bank, Lynn, Mass., has been elected vice-president of the Lynn Gas & Electric Company.

▶ JAMES B. WALKER is resigning the secretaryship of the New York Transit Commission after 26 years service with that board and its predecessors. Mr. Walker is also secretary of the National Association of Railroad and Utilities Commissioners. He expects to engage in transit consultation.

▶ E. C. EATON, chief engineer of the Los Angeles (Cal.) County Flood Control District for the past seven years, has resigned to enter private practice. Mr. Eaton was named chief flood control engineer in 1927, succeeding J. W. Regan. He previously was for five years an irrigation engineer with the California state engineering department.

▶ W. HUNTER SNEAD has been appointed promotional sales representative of the West Virginia Pulp & Paper Company with headquarters in New York City. Mr. Snead had been sales promotion manager of Edwin L. Wiegand Company, Pittsburgh, Pa., electrical heating engineers and manufacturers of "Chromalox" heating units, for more than eight years.

OBITUARY

Richard T. Higgins

Richard T. Higgins, chairman of the Connecticut Public Utilities Commission since its establishment 24 years ago, died in the Hartford Hospital September 16, following an abdominal operation. Nationally known in the field of public utilities regulation, Chairman Higgins was elected president of the National Association of Railroad and Utilities Commissioners last year and was occupying that office at the time of his death.

He was born in Washington, Conn., in 1865, attended St. Francis College in Brooklyn, N. Y., and after being admitted to the Connecticut bar in 1890 he began practice at Woodbury. Later, moving to Winsted, he served as corporation counsel from 1904 to 1912 and was a member of the Connecticut House of Representatives in 1909. It was in 1910 that he was appointed to the old Board of Railway Commissioners by the late Governor Weeks, the following year assuming the duties of chairman of the reorganized board, the new Public Utilities Commission. Chairman Higgins' administration became widely known for its conservative and sound regulatory methods. The intimate association which he personally maintained with the representative engineers of the state during his long period of service enabled him to obtain a first-hand knowledge of public utility operation and management and resulted in the expert decisions which he handed down in the engineering cases brought before him. In 1921 Mr. Higgins received an honorary degree of doctor of laws from Fordham University and two years ago the Connecticut Society of Civil Engineers elected him to honorary membership.

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▶ G. L. EVANS, a vice-president of the Wagner Electric Corporation, St. Louis, died September 10 in St. John's Hospital in that city, in his forty-ninth year. Mr. Evans was born in St. Louis and received his education in the School of Engineering of Washington University. He entered the employ of the Wagner company following graduation and had been connected with that organization continuously for 25 years.

▶ GEORGE F. HOWLAND, treasurer of the Massachusetts Lighting Companies, died at his summer home in Mattapoisett, Mass., August 22, in his sixtieth year.

▶ HOWARD L. ROGERS, formerly a partner in the firm of Stone & Webster, Boston, and later vice-president and a director of the Stone & Webster Engineering Corporation, died at his home in Chestnut Hill, Mass., September 20, after a long illness. He was born at Newton Center, Mass., in 1871; educated at the Massachusetts Institute of Technology, and joined Stone & Webster in 1893. He was in executive charge of many major construction projects throughout the country for a long period in connection with hydro-electric, steam power and other developments for utilities under that management and for clients of the house. He retired in 1929.

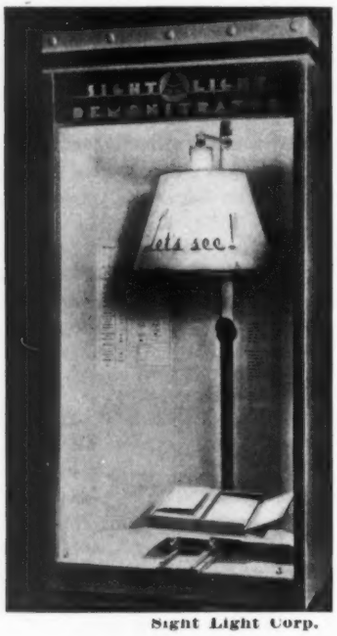
▶ GEORGE H. SCRANTON, president of the Derby (Conn.) Gas & Electric Company, died September 16 at his summer home in Preston, Ont. He was 73 years old. Mr. Scranton began his business career with the Derby Gas & Electric Company, starting when a young man as a clerk. Subsequently he was advanced through various positions until he became secretary. When Charles H. Nettleton died in 1925 Mr. Scranton was elected president. He was also secretary-treasurer and general manager of the Birmingham Water Company and treasurer of the Industrial Association of Naugatuck Valley.

▶ VICTOR H. GREISSER, formerly chief engineer for the Washington Water Power Company, died August 20 at his home in Menlo Park, Calif., following an illness of several years duration. Mr. Greisser entered the employ of the Washington Water Power Company in 1906 in the engineering department and his first work was as electrical foreman in the construction of the Post Falls power station. Upon completion of the first unit he returned to Spokane and for the next five years was engaged in electrical designing work. In 1912 Mr. Greisser was made electrical engineer and eight years later he was appointed chief engineer, serving in that capacity until last October, when his health necessitated moving to California, at which time he was made consulting engineer for the company. Mr. Greisser was a member of the American Institute of Electrical Engineers, American Society of Mechanical Engineers and the American Society of Civil Engineers.

NEW EQUIPMENT

Sight-Light Demonstrator

A sight-light demonstrator developed to provide a visual demonstration of the amount of light our eyes would select for various tasks for comfortable seeing has been announced by the Sight Light Cor-



Sight Light Corp.

poration, Chrysler Building, New York. As the lever is moved slowly from left to right more light falls upon the seeing task. The lever enables the customer making a sight-light test to increase the light gradually until the eyes have selected the intensity which is most comfortable for the task selected; the flap which covers the sight meter is turned over and the intensity of light selected is recorded on the sight meter, thus providing a scientific check of the intensity of the light which is needed for comfortable seeing. This reading is then compared with the chart located on one of the back panels of the cabinet specifying the size of lamp bulbs that are needed for the floor or table lamp in order to secure the amount of light that has been selected in performing the particular seeing task. It can be had for $35 net with accessories, but not including the sight meter.

•

DOUBLE-UNIT PUSH BUTTONS consisting of two type J units mounted in a vapor-proof and dust-tight case have been announced by the Electric Controller & Manufacturing Company, Cleveland, Ohio. They permit simultaneous operation of two separate circuits by a single lever or provide mechanically interlocked, individual operation of first one circuit and then the other. These push buttons are of the momentary contact style, which means that, after the operating lever has been released, the contacts of the type J unit always return to the normal position. The rating is 15 amp. on a.c. circuits up to 550 volts.

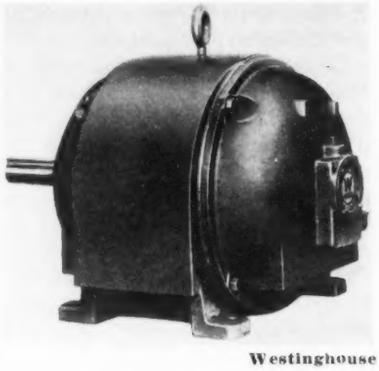
•

JASPER BLACKBURN PRODUCTS CORPORATION, St. Louis, Mo., has announced a Blackburn hoist which operates with worm and gear mechanism. It contains no dogs or springs to hold or release load. The load will remain in the exact position left by operator and does not have to be lifted to slacken pull. To release the load it is only necessary to reverse the switch on the handle.

•

Splash-Proof and Weather-Proof Drive

A splash-proof, drip-proof and weather-proof motor for use indoors or outdoors or for any applications where drippings or splashing liquids are encountered has been announced by the Westinghouse Electric & Manufacturing Company. Entirely new, not an adaptation of an open machine with inclosures applied, this motor has frame and end brackets of solid castings of thick cross-section inherently resistant to rust and corrosion. The conduit box is made of



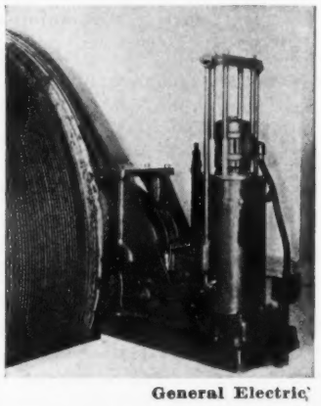
Westinghouse

cast iron so that there are no exposed sheet steel parts to corrode.

A baffle plate cast integral with the inner side of the motor bracket prevents splashing liquids or seepage in outdoor usage from reaching the motor windings. These motors are offered with either ball or sealed sleeve bearings. Splash-proof motors are rated 50 deg. continuous and are offered in both the squirrel-cage and wound-rotor types.

Electric Thrustor

A number of improvements in the G. E. "Thrustor," a self-contained combination of motor-driven centrifugal pump, oil chamber and piston that produces a smooth straight-line thrust through a definite length of stroke especially suitable for the operation of clutches, brakes, valves, doors, etc., have



General Electric

been announced by the General Electric Company. The line consists of a complete range of standard models providing ten combinations of thrust and stroke ratings varying from 50 to 3,200 lb. thrust and from 2 to 16 in. stroke.

In the new Thrustor the impeller housing of the centrifugal pump is stationary, a rigid shaft running in ball bearings connecting the impeller to the driving motor. A number of driving motor arrangements are available, a.c. or d.c. All motors are totally inclosed, except d.c. and single-phase motors on the 50-lb. size, for protection against dirt and moisture.

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Radio Noise and Fault Locater

Location of radio noises and their origin on distribution systems is facilitated by the Model 233 noise and fault locater of the Tobe Deutschmann Corporation, Canton, Mass. It has been produced through collaboration with utility and other noise investigators to meet their needs of portability, sensitivity, efficiency, ease and convenience of operation. Built-in loudspeaker makes noises audible to lineman while set remains on the ground. Size is 12x12x7½ in. and weight is 21 lb. fully equipped.

•

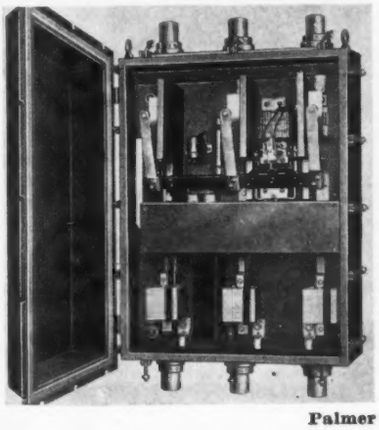
"MERCURY RECTIGON," an ideal accessory for cars with an unusual battery drain, has been announced by the Westinghouse Electric & Manufacturing Com-

pany. Radios, free-wheeling, windshield defrosters, etc., have placed an unusual drain on the battery, for which the generator, with ordinary driving, cannot compensate. To step up the generator may harm both the generator and battery. The Mercury Rectigon, a full 5-amp. charger, will quickly replace the energy taken from the battery and actually tapers off as the battery approaches full charge, it is claimed.

•

Network Protector by Palmer

The Palmer Electric & Manufacturing Company, Waltham, Mass., announces an a.c. network protector which affords freedom from "pumping," ruggedness, compactness, reduced maintenance, low energy consumption and low cost. The reverse energy relay has been made insensitive to small reversals of energy flow, a time-delay device controlling the interval between reclosures for the periodical impulses of larger magnitude. In spite of powerful relay action the energy consumption is no greater than for existing protectors. Reclosure with



Palmer

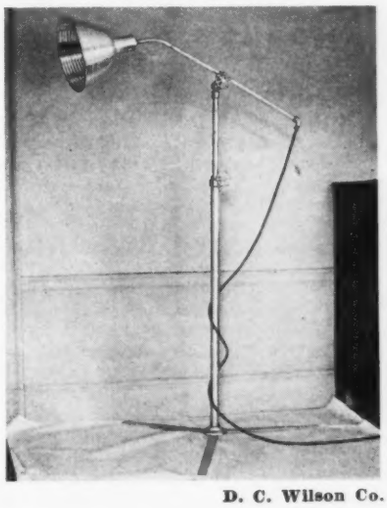
transformer voltage different from network voltage is possible, although a lockout prevents reclosure if phase rotation has been reversed. Additional automatic control for secondary overload protection is also offered. Absence of springs and delicate or complicated parts simplifies field inspection and maintenance.

•

MERRILL'S VOLTAGE INDICATOR, a new means of reading lighting circuit voltages, consists of a Weston "Sight Meter" used in conjunction with an inclosed carbon lamp whose lumen output varies pronouncedly with voltage. The lamp is connected to the circuit, its container placed over the photronic cell of the Sight Meter and the resulting indication of foot-candles converted into volts through the medium of a conversion scale on the tubular container. List price of the indicator is $2. Obtainable from G. S. Merrill, Nela Park Engineering Department, General Electric Company, Cleveland.

Portable Standlight

In addition to its line of insulated and shock-proof portable lamp guards, the D. C. Wilson Company, New York, has developed a rugged portable Standlight taking from 100 to 500-watt lamp. The



D. C. Wilson Co.

standard is of 1½-in. galvanized pipe, the adjustable insert ¾-in. and the reflector arm ½-in. pipe. The base is held 1 in. off the floor for shock absorption in seting down, with three-point stability, on uneven surface. The reflector is 13 in. in diameter and the arm adjustable, with ball and socket fitting to any angle and position from 12 in. to 12 ft. above the floor.

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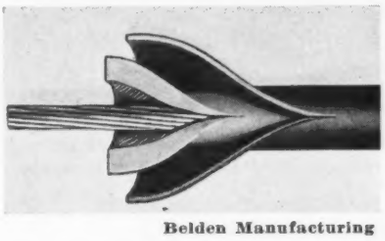
Dupont Synthetic Rubber

Application of the new Dupont synthetic rubber "Duprene" to electrical uses is announced by the Belden Manufacturing Company, Chicago. The first product available with the Duprene covering is an ignition cable for automotive use. Since the new covering is highly resistant to attack by heat, oil and corona, it can be expected that conductors protected with it will later be available for special installations where these



Belden Manufacturing

conditions are present. The new ignition cable, known as Belden 7799, is provided with special Belden orange rubber compound core and a thin "Duprene" jacket. Spark plug wires thus protected are expected quickly to replace lacquered wires in buses, trucks and in all services where conditions are particularly severe.

ENGINEERING DATA FROM MANUFACTURERS

Bulletins and catalogs now available to engineers by manufacturers and associations

ALUMINUM PAINT—ITS USES AND APPLICATIONS, just issued by Aluminum Company of America, Pittsburgh, gives specifications for aluminum powder and paste, vehicle, mixing and effective application on electrical equipment—in stations, on towers, poles, structures and buildings—both as primer and finish coats. The 62 pages are well illustrated.

NEMA MOTOR AND GENERATOR STANDARDS supersede and amplify the 1930 edition by National Electrical Manufacturers Association, 155 East 44th Street, New York. Covers rotating machinery from small universal motors to synchronous generators. New sections are on d.c. machines, buffer and grinder motors and motor-generator sets. Contains 176 pages, 8 x 10½ in. Price $2.

ELECTRIC BAKERY, HOTEL, RESTAURANT AND MARINE GALLEY EQUIPMENT in loose-leaf binder form is catalog B-700 of Edison General Electric Appliance Company, Chicago, and gives in its 92 page specifications, rating data, floor plans and some operating costs.

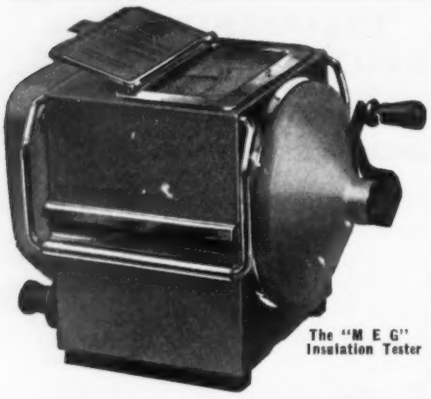
TOBE DEUTSCHMANN CORPORATION'S engineering bulletin L-834 describes the features and use of radio noise and fault locater Model 233 for running down distribution system complaints. (Canton, Mass.)

REVENUE FROM ELECTRIC METAL, a new pamphlet by Detroit Electric Furnace Company, gives consumption and cost data for typical applications of electric furnaces from the load-building viewpoint of electric utilities.

CONTROLLED ATMOSPHERE ELECTRIC FURNACES (12 pages) tells results of processes such as annealing and brazing to which controlled atmosphere has been applied to improve quality and costs. General Electric Company, Schenectady, N. Y.

PENNSYLVANIA TRANSFORMER COMPANY, 1701 Island Avenue, Pittsburgh, has issued Bulletin 300, which details such structural features of its products as prevention of syphoning, boltless secondary connections, case reinforcement and all-circular coil design.

MODERN METHODS OF GROWING AND MARKETING FLOWERS AND VEGETABLES show how agriculturalists are designing hotbeds and greenhouses to apply electric heat stimulation and then to illuminate their display stands; 8 pages of sketches and data in this General Electric bulletin GEA-1644C.



The "M E G" Insulation Tester

—To Detect and Prevent Trouble in Electrical Equipment—

TRY MAKING periodic tests of insulation resistance—with "MEGGER" instruments!

The illustration shows the very popular "Meg" Insulation Tester.

Midget "Megger," "Bridge-Meg" and high-range "Megger" types also available.

Write for descriptive Bulletin 1355-W.

JAMES G. BIDDLE CO.

ELECTRICAL INSTRUMENTS

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HIGH GRADE HARD PORCELAIN

FOR

Electrical Specialties

High and Low Voltages

Imperial Porcelain Works

TRENTON, NEW JERSEY

SALES OPPORTUNITIES IN NEW CONSTRUCTION

Spot coverage of new work. Projects approved and proposed, bids requested, equipment wanted, funds available. Prospects for the electrical manufacturer.

MEMPHIS, TENN.—Plough, Inc., plans installation of motors and controls, conveyors, etc., in new addition to drug and chemical plants at Memphis and Brooklyn, N. Y. Cost about $500,000.

WASHINGTON, D. C.—Bureau of Air Commerce, Department of Commerce, plans installation of airway lighting system from Washington to Nashville, Tenn., about 580 miles, including aviation beacons, radio range stations and other facilities. Proposed to ask bids soon. Appropriation of $465,000 has been made.

DAYTON, OHIO—Contracting Officer, Material Division, Air Corps, Wright Field, Dayton, asks bids until October 8 for one 15-ton and one 5-ton electric cranes, five-motor type (Circular 108); until October 28 for four air-cooled, belt-driven compressors (Circular 116).

SHELDON, IOWA—Has engaged H. L. Cory, Baum Building, Omaha, Neb., consulting engineer, to make surveys and estimates of cost for city-owned electric light and power plant.

NITRO, W. VA.—Appalachian Electric Power Company, Roanoke, Va., plans construction of aerial transmission line over Kanawha River, near Nitro, consisting of two three-wire 132,000-volt circuits, suspended from steel towers on each bank of river. Application has been made for federal permission.

TOMBSTONE, ARIZ.—Mellgren Mines Corporation, Tombstone, care of Louis Heilbron, Texarkana, Tex., treasurer, recently organized, plans installation of motors and controls, electric hoists, transformers and accessories, and conveyors in new gold mining and milling plant. Financing for $420,000 has been authorized, considerable part of proceeds to be used for purpose noted.

AUBURN, N. Y.—Soon takes bids for new street-lighting system and electric power plant for service, using Diesel engine-generating units. Fund of $310,000 has been secured through Federal aid. Burns & McDonnell Engineering Company, 107 West Linwood Boulevard, Kansas City, Mo., is consulting engineer.

PINOPOLIS, S. C.—Santee-Cooper Authority, care of Mayor Burnet Maybank, Charleston, S. C., chairman, is considering reports submitted by Foundation Company and Murray & Flood, engineers, both New York, N. Y., for proposed navigation and hydro-electric power projects on Santee and Cooper Rivers, including 200,000-hp. hydro-electric generating station near Pinopolis, power substations, switching stations, and about 475 miles high-tension transmission lines for service in coastal district of State, with distributing systems at certain points. Fund of $25,000,000 is planned, to be secured through federal aid.

GREENVILLE, MISS.—Is having surveys and estimates of cost made by Burns & McDonnell Engineering Company, 107 West Linwood Boulevard, Kansas City, Mo., consulting engineer, for proposed city-owned electric light and power plant.

TOLEDO, OHIO—Chesapeake & Ohio Railway Company, Richmond, Va., plans installation of heavy-duty motors and controls, electric hoists, conveyors and other material-handling equipment for new addition to ore and coal docks at Presque Isle, near Toledo. Cost about $500,000

DAYTON, TENN.—Plans transmission line from Athens, Tenn., to city, by way of Decatur, Tenn., for power supply for commercial distribution. Work will be carried out in conjunction with Tennessee Valley Authority, Knoxville, Tenn., with which contract has been signed for T.V.A. power.

MODESTO, CALIF.—Modesto Irrigation District asks bids until October 8 for high-voltage transformers (Specification No. E-20); for feeder voltage regulators (Specification No. E-21).

GRAFTON, W. VA.—United States Engineer Office, Pittsburgh, Pa., asks bids until October 16 for construction of Tygart Valley reservoir dam, near Grafton, including control mechanism, lighting system, etc. (Circular 66). Dam will be used in future for hydro-electric power development, for which bids will be called later, including transmission line construction. Fund of $10,000,000 is available for project.

ST. LOUIS, MO.—Mississippi Valley Equipment Company, 511 Locust Street, has inquiries out for 1,200 to 1,800-kva. and 25-kw. generator units with accessories, motors, air compressors, etc.

LOS ANGELES, CALIF.—Water and Power Bureau asks bids until October 9 for three 500-kva. and three 200-kva., 34,500-volt, outdoor type, oil-insulated, self-cooled, station type distribution transformers for local system (Specification No. 1511).

WASHINGTON, D. C.—General Purchasing Officer, Panama Canal, asks bids until October 11 for 18,144 flashlight batteries, quantity of flashlights, electric storage batteries, dry cells, 100 electric water heaters, etc. (Schedule 2999).

KINGMAN, ARIZ.—Gold Standard Mines Company plans installation of motors and controls, transformer equipment, conveyors, etc., in connection with rebuilding of Katherine mill at local gold-mining properties, recently destroyed by fire. Loss over $115,000.

WABASH, IND.—Has authorized surveys and estimates of cost for proposed city-owned electric light and power plant, including valuation of local properties of Northern Indiana Power Company.

KENOVA, W. VA.—Appalachian Electric Power Company, Roanoke, Va., has authorized construction of new transmission line from Turner substation, near Dunbar, W. Va., to South Point substation, vicinity of Kenova. Work will be in charge of Hoosier Engineering Company, Indianapolis.

SEATTLE—Board of Public Works desires bids until 10 a.m., October 11, for furnishing the following electrical equipment and apparatus for the Diablo power house, Skagit project: 196/230-kv. oil circuit breakers; 196-kv. disconnecting switches; auxiliary metal-clad switchgear; wall bushings; station light, power and heat switchboard; distribution panels and cabinets; neutral circuit breakers; rectifier equipment for switch operation, and main unit instrument transformers. Cost placed in excess of $200,000.

DENVER, COLO.—U. S. Bureau of Reclamation will receive sealed bids up to 2 p.m., October 15, for furnishing and delivering f.o.b. at the factory or at Boulder City, Nev., three deep-well turbine-type, motor-driven pumping units of 5,000 gal. per minute capacity; two portable, deep-well, turbine-type motor-driven pumping units of 1,500 gal. per minute capacity and 14 motor-driven oil pumps of various capacities.